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Articles

Hispanics' Understanding of Social Security and the Implications for Retirement Security: A Qualitative Study

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Hispanics constitute the nation's largest minority group, and the Census Bureau projects the Hispanic share of both the overall and the retirement-age U.S. population to increase substantially in the next three decades. Compared with other racial/ethnic groups, Hispanic adults have the lowest rates of high school and college graduation, are more concentrated in low-wage jobs, and have lower incomes and health insurance coverage. However, Hispanics' life expectancy is greater than that of other population groups. These trends underscore the importance of effective outreach to Hispanics to improve their understanding of Social Security and to enhance their retirement security overall. In this article, we examine Social Security literacy and preferred ways of receiving information about the program. We assemble focus groups of three ancestries (Mexican, Puerto Rican, and Cuban) and of English and Spanish speakers. We report the differences and the similarities in the results among these ancestry and primary-language subgroups.

Introduction

As members of the baby-boom generation reach retirement age, concern is growing about the adequacy of retirement planning and savings in the United States. Although the literature on retirement preparedness suggests that many Americans might face economic insecurity in their senior years (Rhee and Boive 2015; Government Accountability Office 2015; Williams and Jackson 2015), an increasing number of studies suggest that certain demographic groups face particular challenges—and Hispanic Americans are one such group (Hopkins 2014). Those challenges include comparatively low-wage jobs, low levels of wealth, limited health insurance coverage, and longer life expectancies. As a result, Hispanics are at greater risk than the general population of having low levels of retirement savings and, therefore, of relying on Social Security benefits as a major source of retirement income.

Prospective reliance on Social Security income in retirement means that it is important for Hispanics to be informed about program provisions.[1] The Social Security Administration (SSA) provides information on retirement benefits in English and Spanish and uses a variety of media to deliver that information to the public. However, such efforts might not adequately inform all Hispanics about their Social Security retirement benefits. After all, the Hispanic community is not homogeneous. According to studies by the Pew Research Center, about 65 percent of Hispanics in America are of Mexican ancestry, almost 10 percent

Selected Abbreviations	
NCLR	National Council of La Raza
SSA	Social Security Administration
UAS	Understanding America Study

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are Puerto Rican, and Cubans and Salvadorans each represent about 4 percent (Lopez, Gonzalez-Barrera, and Cuddington 2013; Krogstad 2016). Among Hispanic Social Security beneficiaries, the three largest ancestry groups are Mexicans, Puerto Ricans, and Cubans, representing 52 percent, 14 percent, and 10 percent, respectively (Martin 2007).

In addition to the cultural differences between Latin American places of origin, these Hispanic subgroups differ in terms of median age, educational attainment, poverty rates, and homeownership rates (Lopez, Gonzalez-Barrera, and Cuddington 2013). Those economic, demographic, and cultural differences might affect not only knowledge about Social Security but also preferred ways of receiving program-related information. We conducted focus-group sessions composed of Mexicans, Puerto Ricans, and Cubans and found differences between those subgroups (as well as between English speakers and Spanish speakers) in knowledge of Social Security programs and benefits and in preferred ways of receiving program-related information.[2] Our study is one of the first to research these between-group differences and discuss their implications.

Enhancing Hispanics' understanding of Social Security is important for the target population and for SSA. For Hispanics, Social Security benefits represent a substantial part of retirement income. The more they know about their benefits, the better equipped they are to make appropriate decisions to ensure a secure retirement. For the agency, the fact that Hispanics represent a significant and growing proportion of beneficiaries (with longer life expectancies than other population groups) has far-reaching implications for program finances. Additionally, intragroup differences in Social Security knowledge and in preferred ways of receiving program-related information will affect how the agency reaches out to Hispanic subgroups.

In the next section, we summarize literature on the retirement savings of Hispanics, the importance of Social Security to their retirement income, and their preferred ways of receiving program-related information. In the following section, we discuss our methodology (including our use of a focus-group questionnaire) and provide descriptive statistics on the focus-group participants. The last two sections present our findings—from both the focus-group discussions and the questionnaires—and discuss the implications of our findings for further research and for potential SSA initiatives.

Background

Hispanics constitute the nation's largest minority group, at 17.6 percent of the population as of 2015 (Census Bureau, n.d.).[3] That share is projected to increase to 26.5 percent by 2050 (Census Bureau 2014b, Table 11). Although the median age of the Hispanic population is younger than that of the general population, the Hispanic population aged 65 or older is projected to quintuple from 2012 through 2050. By 2050, the share of Americans aged 65 or older who are Hispanic will exceed 18 percent (Hummer and Hayward 2015, 21). Consequently, the share of Hispanics among Social Security beneficiaries will increase. Compared with members of other racial/ethnic groups in America, Hispanic adults have the lowest rates of high school and college graduation, are more concentrated in low-wage jobs, and have lower incomes and health insurance coverage rates (Hummer and Hayward 2015; Gassoumis, Wilber, and Torres-Gil 2008). Correspondingly, in 2013, the median wealth of a Hispanic family ($14,000) was only one-tenth the median wealth of a white non-Hispanic family ($134,000) (Boshara, Emmons, and Noeth 2015, 7–9). Moreover, during the Great Recession, among all racial/ethnic groups, Hispanics suffered the largest decline in median household wealth (Kochar, Fry, and Taylor 2011). They also saw continued declines in the postrecession recovery; from 2010 through 2013, Hispanics' median wealth fell by 14.3 percent while that of non-Hispanic whites increased by 2.4 percent (Kochar and Fry 2014).

Despite Hispanics' lower socioeconomic status, their life expectancy is greater than that of other population groups. Hispanic men aged 65 in 2014 can expect to live to age 85.0, versus 83.4 for non-Hispanic white men; Hispanic women aged 65 in 2014 can expect to live to age 87.4, versus 85.8 for non-Hispanic white women (Census Bureau 2014a, Table 2).[4] Higher life expectancy in the context of lower socioeconomic status has obvious and serious implications for retirement security among Hispanics (Gassoumis, Wilber, and Torres-Gil 2008, 3).

Language proficiency varies across the U.S. Hispanic population, as a significant fraction speaks primarily Spanish. According to the Pew Research Center, 36 percent of Hispanics in the United States are bilingual, 38 percent speak mainly Spanish, and only one-quarter speak mainly English (Krogstad and Gonzalez-Barrera 2015). Language preferences vary substantially across first-, second-, and third-generation U.S. Hispanics. Among first-generation

families, 61 percent consider Spanish their primary language; that figure falls to 8 percent among second-generation Hispanics and to 1 percent among the third generation (Taylor and others 2012, Chapter IV). As mentioned earlier, the Hispanic community includes individuals of many different ancestries. Knowledge about Social Security may differ across these sub-groups and so may their preferences for receiving Social Security–related information.

Hispanics and Retirement Saving

Studies find that Hispanics lag behind the general U.S. population in savings, ownership of financial assets, and workplace retirement benefits. Pruden-tial Research (2014), for example, found that lower proportions of Hispanics reported having a savings account (62 percent versus 81 percent of the general population) and investments such as stocks (8 percent versus 23 percent), bonds (3 percent versus 11 per-cent), and mutual funds (7 percent versus 20 percent).[5] Regarding savings specifically designated for retire-ment, only 19 percent of surveyed Hispanics had an individual retirement account (IRA), compared with 39 percent of the general population. In addition, 38 percent of Hispanics participated in a workplace-based retirement plan, such as a 401(k), 403(b), or 457, compared with 51 percent of the general population; and 16 percent of Hispanics had a workplace pension plan, compared with 23 percent of the general popula-tion (Prudential Research 2014).

Many researchers view the lack of access to a work-place retirement plan as a particularly important reason for Hispanics' retirement insecurity, as it both reflects and reinforces key aspects of economic disadvantage (National Council of La Raza [NCLR] 2015; Rhee 2013; Sabadish and Morrissey 2013). For example, in an analysis of data from the March 2014 Current Population Survey for California, the NCLR found that Hispanics were more likely than other groups to work for an employer that did not offer a retirement plan. Foreign-born Hispanics were found to face the greatest disadvantage in this regard. The NCLR attributed those findings to the high likelihood that Hispanics are con-tingent workers, who are typically ineligible for work-place benefits; or that they are likely to work for small businesses, which are less likely to offer retirement plans. Immigrant employment is also concentrated in industries that generally lack employer-provided pensions. In addition, the study found that Hispanics who do have access to retirement plans at work are less likely to participate in them than other groups are. This finding demonstrates the strong links between plan participation and income and wealth—specifically, that Hispanics' participation in and contributions to employer-provided retirement plans are limited by their low incomes and wealth (NCLR 2015).[6]

Studies on retirement preparedness suggest that Hispanics may place a lower priority on saving for retirement and that they engage less in retirement plan-ning than do other demographic groups, often because of competing short-term financial goals. For example, Prudential Research (2014) found that 53 percent of Hispanics ranked "saving for retirement" as their most important financial priority, versus 62 percent for the general population. Fourteen percent of Hispanics and 10 percent of non-Hispanics identified "purchasing or owning a home" as their most important long-term goal, and the corresponding percentages for "college tuition for my children" were 11 percent and 9 percent (ING Retirement Research Institute 2012).[7]

Some commentators emphasize the importance of interpreting findings about Hispanics' financial priori-ties and goals in the contexts of economic realities and core cultural values. The Prudential Research study's findings suggest that the importance of retirement plan-ning is "a culturally derived concept" in that "many Latinos still hold on to the value that retirement is a step in life where they will be supported by the chil-dren they raised with so much care" (Korzenny 2015).

Other factors that may influence Hispanics' deci-sions on saving for retirement (and on building wealth in general) include plans to live outside the United States in retirement and an aversion to debt and risk, which may contribute to a focus on shorter-term financial goals (Prudential Research 2014; Korzenny 2015). On the latter point, Prudential Research (2014) and Wells Fargo (2014)[8] found that Hispanics are more financially conservative and risk-averse than the general population, and as a result they are inclined to own fewer financial products.

Hispanics and Social Security

Social Security benefits constitute a significant propor-tion of retirement income for the Hispanic population. Among Hispanic beneficiaries aged 65 or older in 2014, 42 percent of married couples and 59 percent of unmarried persons relied on Social Security for 90 percent or more of their income (SSA 2016a, Table 9.A3).[9] Those percentages are higher for Hispan-ics than for other groups in large part because Hispanic workers are less likely than other workers to be covered by employer-sponsored retirement plans and because

Hispanic households are less likely than other households to have dedicated retirement savings (Rhee 2013). Furthermore, contributions to Social Security are mandatory for those who work in covered employment. Finally, unlike savings in other retirement plans, Social Security accruals cannot be diverted to other uses. This is important because providing financial support to other members of multigenerational Hispanic families, including (for non-U.S. born Hispanics) sending money to relatives in their home country, often competes with retirement saving (Prudential Research 2014).

Hispanics tend to have lower average earnings than do workers overall.[10] As a result, the progressive formula that determines an individual's Social Security benefit level tends to help Hispanics because it replaces a larger percentage of preretirement earnings for low earners than it does for high earners. Additionally, with their longer life expectancies, Hispanics benefit from guaranteed Social Security income that is annually adjusted for inflation (SSA 2016b).

There are key differences between population groups in self-reported literacy about Social Security. Surveys have found that confidence in one's own program knowledge is generally lower among Hispanics than among whites and blacks.[11] The University of Southern California conducts the Understanding America Study (UAS), an ongoing series of online surveys of American households. UAS survey 16 (UAS16) covers Social Security and retirement literacy.[12] In 2015, its Hispanic respondents were more likely than whites to report being "not too knowledgeable" or "not at all knowledgeable" about various aspects of the Social Security program, such as their own full retirement age, whether benefits are adjusted for inflation, and how benefits change based on one's

age when they are claimed.[13] That divergence is not a recent phenomenon. Surveys commissioned by SSA and conducted by the Gallup Organization from 1998 to 2004 yielded similar findings. In 2001, for example, 68 percent of Hispanics stated that they knew little or nothing about Social Security benefits, compared with 41 percent of whites and 50 percent of blacks. The outcome for Hispanics was up from 62 percent in 1998.

In addition to measuring respondents' confidence in their knowledge, the 2015 UAS16 assessed their actual knowledge about Social Security. Hispanics scored lower than whites on objective knowledge of aspects of retirement benefits but scored comparably to or better than blacks (Table 1).

The Gallup surveys also included questions assessing knowledge of Social Security program facts, such as the effects on benefits of claiming at different ages and whether benefits are adjusted for inflation. As in the 2015 UAS16, Hispanics tended to score lower than whites.

Hispanics' relative lack of knowledge about Social Security must be viewed against the background of a low—but growing—confidence in Social Security's future solvency. The Gallup surveys showed that Hispanics were less confident than whites and blacks that Social Security would be there for them in retirement. However, results also indicated that all race and ethnicity groups grew more confident about Social Security's future over the years 1998 to 2004. Surveys by the Employee Benefit Research Institute in 2007 and by MassMutual Financial Group in 2015 found that Hispanics were more likely than the general population to believe that Social Security would be able to pay the benefits to which they would be entitled (Helman, VanDerhei, and Copeland 2007; MassMutual

Table 1.
Percentage of survey respondents with knowledge of selected aspects of Social Security retirement benefits, by race and ethnicity

Aspect	Hispanic	White	Black
Respondent's own—			
Early eligibility age for Social Security retirement benefit	28	39	20
Full retirement age for Social Security retirement benefit	13	24	9
What delayed retirement credits are	17	30	17
Whether Social Security retirement benefits—			
Are adjusted for inflation	50	65	53
Are affected by the age at which one starts claiming	68	89	65
Must be claimed as soon as the individual retires from work	55	86	67
Whether someone who has never worked for pay may claim benefits if			
his or her spouse qualifies for Social Security retirement benefits	72	80	63

SOURCE: 2015 UAS16.

https://www.socialsecurity.gov/policy/docs/ssb/

Financial Group 2015). Those surveys documented a continuing increase in confidence in Social Security's future among all groups.

Hispanics and Information on Retirement and Social Security

A lack of financial knowledge and access to information can hinder retirement saving and planning and lower one's financial confidence. Recent studies indicate that a lack of information may pose a particular problem for Hispanics. ING Retirement Research Institute (2012), for example, found that respondents identifying barriers to saving ranked "insufficient income" highest (34 percent of all respondents and 31 percent of Hispanic respondents), followed by "high debt" (24 percent of all respondents and 26 percent of Hispanic respondents). For Hispanic respondents, however, the third-ranked obstacle was "Don't know what my options are"—they saw it as a greater barrier than did other groups (12 percent of all respondents against 18 percent of Hispanics). According to our analysis of 2015 UAS16 data, 70 percent of Hispanic respondents strongly or somewhat disagreed with the statement "I currently have enough information to plan for my retirement," compared with 60 percent of whites and 65 percent of blacks. Hispanics also were more likely to report being interested in learning more about retirement planning, yet were less likely to report knowing the best sources for retirement information.

When asked specifically about information on Social Security benefits, 65 percent of Hispanic UAS16 respondents reported somewhat or strongly disagreeing with the statement "I have enough information about Social Security retirement eligibility" in 2015, compared with 46 percent of whites and 52 percent of blacks. Similarly, 82 percent of Hispanic respondents reported strongly or somewhat agreeing with the statement "I would like to receive more information from Social Security," compared with 61 percent of whites and 68 percent of blacks.

The literature on retirement preparedness finds that workers who plan for retirement typically use both informal and formal strategies. Informal planning involves turning to family and friends for financial and retirement-planning advice, while formal planning involves working with professionals such as financial advisors, banks, accountants, or brokers (Sun, Barboza, and Richman 2007). According to UAS survey 26 (UAS26), which covers preferred ways of receiving Social Security information, Hispanic respondents were less likely than were whites to

have consulted formal sources of information in 2015 (23 percent versus 36 percent).[14] They also were less likely than were whites to have consulted informal sources (28 percent versus 39 percent). Focusing on the different types of informal sources, Prudential Research (2014) found that "family" was cited as the most important source of information on current financial decisions both by Hispanics (39 percent) and by respondents overall (40 percent).

Methodology

We conducted nine focus groups in two locations in the spring of 2015. For each ancestry subgroup (Puerto Rican, Cuban, and Mexican), we recruited for three separate sessions. We held the first six sessions in Miami and the latter three in Los Angeles. We conducted six of the sessions in English and three (one for each ancestry subgroup) in Spanish. (Although participants in the latter sessions spoke primarily Spanish, many of them reported fluency in both languages during the discussions.) Eight of the focus group sessions had nine members and the other had eight members, for 80 participants overall.[15]

Focus-group discussions covered three broad topics: retirement and Social Security literacy, engagement in retirement planning, and preferred ways of obtaining information about retirement and Social Security benefits. This article focuses specifically on Social Security literacy and preferred ways of obtaining information about Social Security, as these topics may have important implications for program policy. The questions we asked in this qualitative exploration are taken from the 2015 versions of UAS16 (which addresses the former topic) and UAS26 (which covers the latter). Our focus-group findings thus complement those of the UAS Internet panels.

Prior to starting the discussions, we administered a short questionnaire to each participant.[16] The paper-based questionnaire covered the main topics described above. Most of the questions were adapted from recent UAS surveys. The goal of the questionnaire was to provide information from each individual that we could compare with the group discussion results and to provide data for intergroup comparisons.

As noted, we recruited 80 participants and distributed them into nine focus groups. We recruited adults aged 25 or older. We screened out retirees but did not place an upper age limit on participation. Participants' ages ranged from 25 to 65. The age distributions did not differ widely across the three Hispanic ancestry subgroups (Table 2). Puerto Ricans were the most

Table 2.
Focus group characteristics, by ancestry

Characteristic	Cuban		Mexican		Puerto Rican		Overall	
	Number	%	Number	%	Number	%	Number	%
Total	26	100.0	27	100.0	27	100.0	80	100.0
Sex								
Men	13	50.0	14	51.8	13	48.2	40	50.0
Women	13	50.0	13	48.2	14	51.8	40	50.0
Age								
25–39	12	46.2	9	33.3	13	48.2	34	42.5
40–55	9	34.6	15	55.6	9	33.3	33	41.2
56–65	5	19.2	3	11.1	5	18.5	13	16.2
Average age	43.7		42.6		42.4		42.9	
Education								
High school	10	38.5	7	25.9	4	14.8	21	26.2
Some college, no degree	10	38.5	10	37.0	8	29.6	28	35.0
Associate's or bachelor's degree	5	19.2	8	29.6	10	37.0	23	28.8
Graduate studies	1	3.8	2	7.4	5	18.5	8	10.0
Marital status								
Married	8	30.8	11	40.7	12	44.4	31	38.8
Divorced	7	26.9	5	18.5	5	18.5	17	21.2
Widowed	0	0.0	0	0.0	1	3.7	1	1.2
Never married	11	42.3	9	33.3	9	33.3	29	36.2
Civil union	0	0.0	2	7.4	0	0.0	2	2.5
Employment status								
Employed								
Full-time	15	57.7	19	70.4	21	77.8	55	68.8
Part-time	5	19.2	5	18.5	4	14.8	14	17.5
Unemployed								
Looking for work	3	11.5	3	11.1	2	7.4	8	10.0
Not looking for work	2	7.7	0	0.0	0	0.0	2	2.5
Because of disability	1	3.9	0	0.0	0	0.0	1	1.3

SOURCE: Focus-group questionnaire.

NOTE: Rounded components of percentage distributions do not necessarily sum to 100.0.

likely to be working and Cubans were the least likely. On average, Puerto Rican participants had the highest educational attainment, while Cubans had the lowest. Cubans also were the least likely to be married and the most likely to be divorced or never married. Mexicans and Puerto Ricans did not differ much in marital status.

Results

In this section, we describe the results of the focus-group discussions and compare them with those obtained from the prediscussion questionnaires. As noted earlier, the discussions and the questionnaires addressed Social Security literacy and preferred ways of obtaining information about Social Security benefits. The focus-group discussions revealed misconceptions and concerns that are common among the ancestry and primary-language subgroups while the responses to the questionnaire revealed differences across the subgroups.

These focus-group results should not be generalized to the broader Hispanic population. The number of participants in the focus groups is small and the sample is not a randomly selected subset of the population. Further, observations provided in the focus groups may have been influenced by the opinions expressed by fellow group members.

Social Security Literacy

Regardless of ancestry and primary language, focus-group discussions revealed low levels of knowledge of the way the Social Security system works and the benefits to which participants may be entitled. Among the misconceptions and misinformation about

Social Security that the participants expressed were the following:

- Men's and women's full retirement ages differ;
- Individuals can claim Social Security retirement benefits as early as age 55;
- The full retirement age is 65;
- Social Security retirement benefits replace 50–80 percent of preretirement income;
- Social Security retirement benefit amounts are based on the highest 3 or 5 years of earnings;
- Citizenship is necessary to receive Social Security retirement benefits; and
- Social Security will no longer exist by the time the focus-group participants retire.

In reality, retirement benefit claiming ages are the same for men and women. The earliest age at which individuals can claim Social Security retirement benefits is 62. The full retirement age varies depending on year of birth; for example, for individuals born during 1943–1954, the age for receipt of full Social Security retirement benefits is 66.[17] Social Security retirement benefits replace about 55 percent of pre-retirement income for low earners, 41 percent for median-earnings workers, and 34 percent for high earners.[18] Social Security retirement benefit amounts are based on the highest 35 years of wage-indexed covered earnings.[19] Citizenship is not necessary to receive Social Security retirement benefits as long as individuals (and their employers) have contributed to Social Security during their working years.[20] Finally, even if the Social Security trust funds are exhausted in the future, projected worker (and employer) payroll-tax contributions will enable the system to pay about 77 percent of scheduled benefits.[21]

Most participants agreed that they would find information on their prospective Social Security benefit amount (if entitled) and on their optimal retirement age useful. In the questionnaire, 74 percent said they would find an estimate of their benefits "extremely" or "very" valuable. In addition, many participants said they were interested in knowing more about whether Social Security is expected to be solvent when they reach retirement age, and what would happen with their benefits in the case of insolvency.

Box 1 presents selected remarks that indicate the types of information participants want from SSA. The discussion revealed similar concerns across the

Box 1.
Types of information Hispanic focus-group participants want from SSA: Selected remarks from members of each ancestry subgroup

Topic	Cuban	Puerto Rican	Mexican
How to prepare for retirement	"If you are, for example, self-employed, how can you spend your money or save your money for your future?"	"What do I need to do to plan better, or at least to learn and then plan, because we don't know much. I don't know much."	"I would like to have more detailed information about whether [investing] is a good idea or not for me… One may put money somewhere and what if they defraud me?" [a]
Own future Social Security benefit amount	"I want to know about benefits. How much? What will my benefits be?"	"I would like to calculate how much I'm going to get, and the other question would be if that's already counting inflation."	"I would like to know how much I need to put in and how much I will get." [a]
Claiming age	"How it affects [your retirement benefits] if you retire at 65 or 67. How much is that going to affect you?"	"I would like to know how it will affect my benefits if I delay my retirement."	"I would ask the same as my colleague here: How old [do I need to be to claim] and how much will I obtain?" [a]
Program solvency	"Will Social Security exist when it comes to the age to retire? Will the future be well enough so they can pay us?" [a]	"If the government defaults or the Social Security defaults, what's going to happen to all of my savings through them? That, I'm very curious [about]."	"I'll hear things, like people who are retired they may get their Social Security cut sometimes… I don't know if it's to meet the needs of whoever the retired people are right now…"

SOURCE: Focus-group discussions.

a. Spanish-speaking participant.

ancestry subgroups, and the box highlights four topics of particular interest to them.

Table 3 presents results of the focus-group questionnaire, which measured objective knowledge of the Social Security program with a series of true-or-false statements. It shows that most participants were knowledgeable about the program in general; for example, 75 percent or more knew that Social Security provides disabled-worker and survivor benefits and that benefits are paid for by payroll taxes. Less prevalent was knowledge on specific topics more directly related to their own potential benefits, such as when benefits can be claimed, whether widowed spouses can be eligible for benefits, and whether benefits are adjusted for inflation. In addition, results differ across ancestry and primary-language subgroups—for example, on whether Social Security benefits must be claimed at retirement and whether benefit amounts are affected by claiming age. Nearly all Puerto Ricans (96 percent) knew that benefit amounts are affected by claiming age, versus 70 percent of Mexicans and 65 percent of Cubans. Similarly, 85 percent of English speakers knew that claiming age affects benefit amounts, versus 60 percent of Spanish speakers. Several facts were less well known across ancestry and primary-language subgroups. Less than 62 percent of participants in any subgroup knew that benefits are adjusted for inflation, that benefits need not be claimed at the time of retirement, and that widowed spouses need not be caring for children to claim benefits. Such results on knowledge of specific benefit-related topics raise concerns about the retirement security outlook for many Hispanics.

Preferred Ways of Obtaining Information about Social Security

The focus groups discussed the types of Social Security information participants wished to receive, as well as whether they preferred to receive that information from formal sources (such as SSA or financial institutions) or from informal ones (such as family, friends, or colleagues).

Participants discussed their experiences with and opinions about some of the mechanisms used by SSA to provide information to citizens, such as online retirement calculators, the *Social Security Statement,* and individual online *my* Social Security accounts. Examples of SSA's online calculators include the Retirement Estimator, the Life Expectancy Calculator, the Retirement Age Calculator, and the Benefits for Spouse Calculator. Only a few people had heard of such tools, and in the questionnaire, only six reported having ever used them. Of those six, most felt that the calculators were valuable instruments, although a few commented on how "scary" it can be to see how much money they are estimated to need to retire comfortably. Those who had not used retirement calculators—whether from SSA or from other sources—seemed interested in learning more about them.

The same was true of *my* Social Security online accounts, which can be created at SSA's website and enable users to check their *Social Security Statement* (described below), report an address change, and manage their benefits. Few people had heard of *my* Social Security, and fewer still had opened their own account. In the questionnaire, only seven participants reported having opened an account; six of them were English speakers.

Table 3.
Percentage of Hispanic respondents who correctly identified true-or-false statements about Social Security retirement benefits, by ancestry and primary language

Statement and correct answer	Overall	Ancestry			Primary language	
		Cuban	Puerto Rican	Mexican	English	Spanish
Individuals who never worked can get benefits (true)	70.0	65.4	77.8	66.7	72.2	65.4
Benefit amounts are not affected by claiming age (false)	77.2	65.4	96.2	70.4	85.2	60.0
Benefits are adjusted for inflation (true)	56.4	60.0	50.0	59.3	53.8	61.5
Benefits must be claimed at retirement (false)	46.3	26.9	55.6	55.6	59.3	19.2
Retirement benefits may be subject to income tax if the beneficiary has work or investment income (true)	66.2	76.0	56.0	66.7	71.7	54.2
Benefits are paid for by a tax on employers and workers (true)	79.2	75.0	76.9	85.2	78.8	80.0
Workers can be entitled to Disability Insurance (true)	94.9	92.0	100.0	92.6	94.2	96.2
Survivor benefits may go to children (true)	76.9	76.0	73.1	81.5	76.9	76.9
Widowed spouses must have children to claim benefits (false)	52.6	56.0	50.0	51.9	55.8	46.2

SOURCE: Focus-group questionnaire.

The *Social Security Statement* is a benefits and earnings statement mailed out by SSA to eligible workers in selected age groups. It contains a worker's earnings history, estimates of the retirement and disability benefits for which the worker (and his or her dependents) is eligible, and information about the Social Security program. In the questionnaire, only 19 percent of participants reported having received a *Social Security Statement*. Among those who recalled having received a *Statement*, most agreed that it is useful. There was, however, some confusion about the frequency with which the *Statement* is sent and about whether it is sent automatically (and, if not, how to obtain one). For instance, an English-speaking Puerto Rican remarked:

> *"I remember, they sent you a little brochure ... when you started working... I haven't received that in a long time. Maybe they're not sending it anymore. You know what I'm talking about. It's a pamphlet and it has your name on it."*

Additionally, a Spanish-speaking Cuban observed:

> *"They used to send you a letter with all the information about your balance. Now they don't send it to you anymore. Now, if you want it, you have to go ask for it."*

A few participants were confused by what they perceived as the inconsistency in whether a given individual received his or her *Statement*. An English-speaking Puerto Rican commented to another who had received *Statements* both in Puerto Rico and in the United States:

> *"They [SSA] are shady because they're selective. I've never heard of [the Statement], period. What's the difference [between you and me]? We're Puerto Rican, right?"*

In some instances, participants were skeptical about the value of the *Social Security Statement* because of the perceived insufficiency of the estimated benefit levels it contained. A few participants, in fact, reported not even reading its contents. For instance, an English-speaking Cuban said:

> *"I think I may receive something in the mail once a year... When I see the Social Security, I file it away. I don't even look at it. It's like, 'Yeah, right.'"*

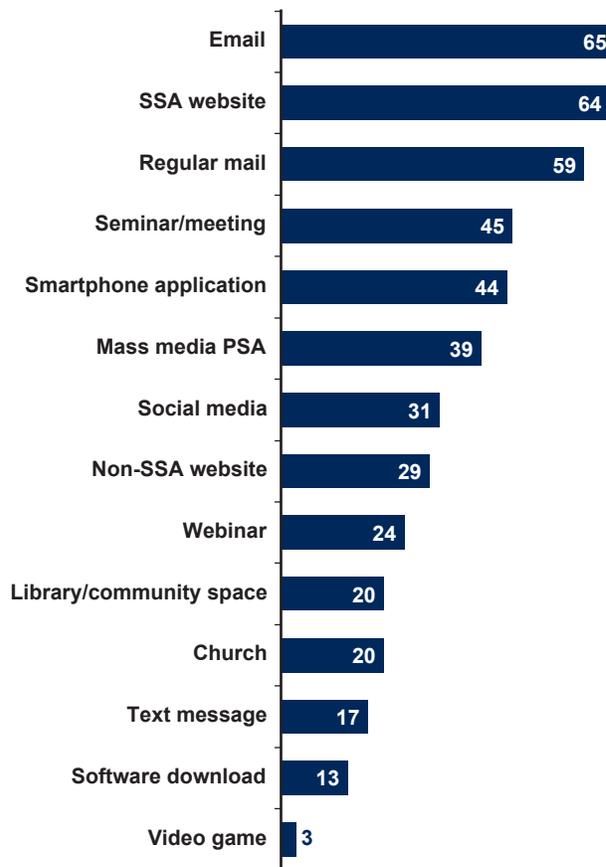In the same vein, an English-speaking Mexican participant said:

> *"I don't even look at it because I got to do what I have to do in order to have enough for myself and anything on top of that will be a blessing. I feel like Social Security is such an unknown."*

Receiving Information from SSA

In the questionnaire, participants were asked "If the Social Security Administration wanted to provide you with educational information about Social Security benefits, what are the best ways for them to make that information available to you?" Participants could select as many options as they wished.

Participants most preferred to receive information from SSA via email, by visiting the SSA website, and via regular (physical) mail (65 percent, 64 percent, and 59 percent, respectively; Chart 1). Although Cubans most preferred regular mail, it was chosen by only a small majority (58 percent; Chart 2). On the other hand, Puerto Ricans resoundingly preferred email (89 percent). Mexicans preferred email and the SSA website almost equally, at

Chart 1.
Preferred ways of receiving information on Social Security: Percentages of focus group participants overall

Method	Percent
Email	65
SSA website	64
Regular mail	59
Seminar/meeting	45
Smartphone application	44
Mass media PSA	39
Social media	31
Non-SSA website	29
Webinar	24
Library/community space	20
Church	20
Text message	17
Software download	13
Video game	3

SOURCE: Focus-group questionnaire.

NOTES: Participants were permitted to select multiple preferred ways of receiving information.

PSA = public service announcement.

Chart 2.

Preferred ways of receiving information on Social Security: Percentages of focus-group participants, by ancestry and primary-language subgroup

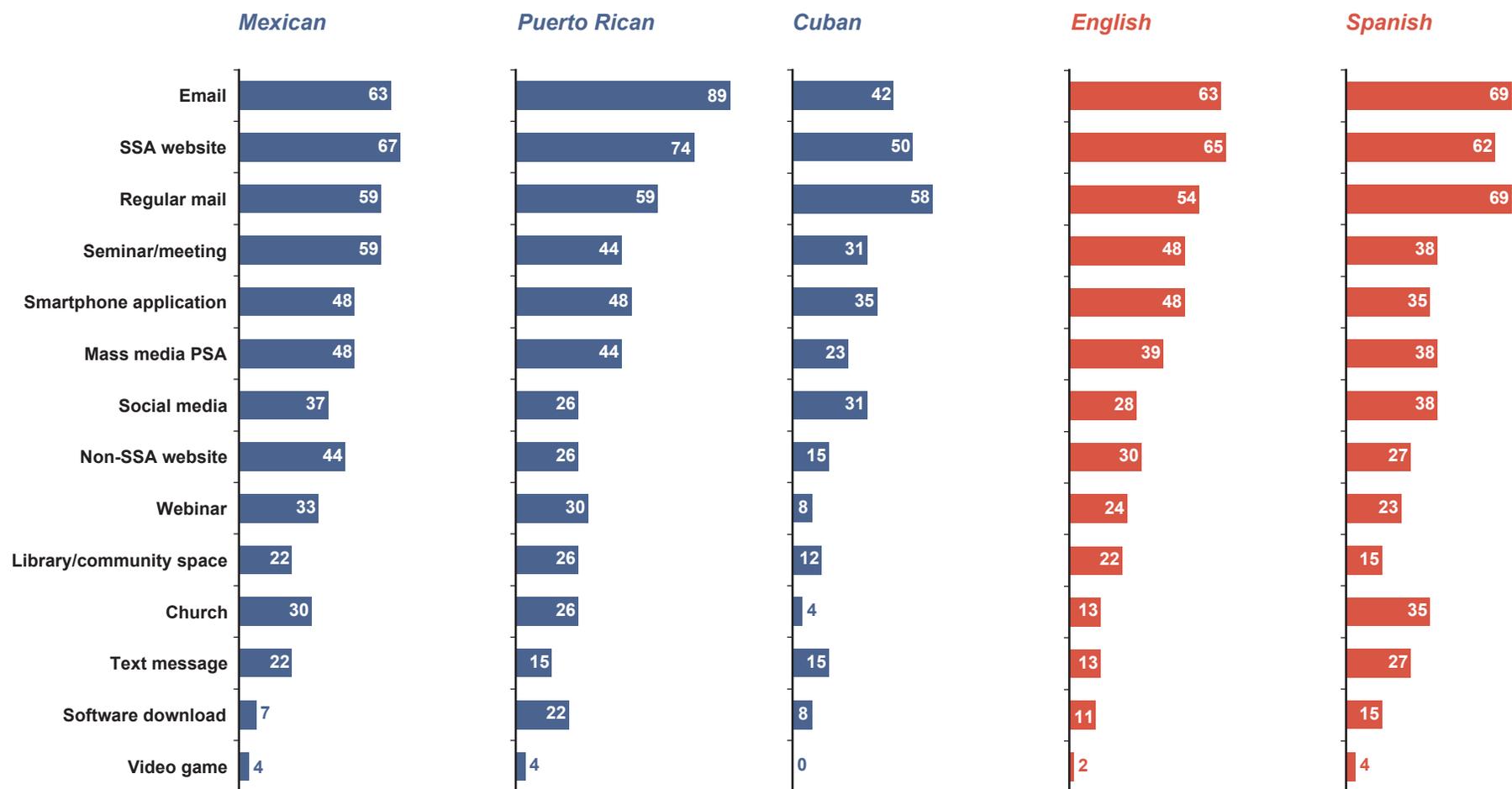|	Mexican	Puerto Rican	Cuban	English	Spanish
Email	63	89	42	63	69
SSA website	67	74	50	65	62
Regular mail	59	59	58	54	69
Seminar/meeting	59	44	31	48	38
Smartphone application	48	48	35	48	35
Mass media PSA	48	44	23	39	38
Social media	37	26	31	28	38
Non-SSA website	44	26	15	30	27
Webinar	33	30	8	24	23
Library/community space	22	26	12	22	15
Church	30	26	4	13	35
Text message	22	15	15	13	27
Software download	7	22	8	11	15
Video game	4	4	0	2	4

SOURCE: Focus-group questionnaire.

NOTES: Participants were permitted to select multiple preferred ways of receiving information.

PSA = public service announcement.

63 percent and 67 percent, respectively. Nearly half of the participants—in roughly equal proportions across subgroups—expressed a preference to receive information via smartphone, although other tech-based methods (such as via software download, text message, and video game) did not strongly appeal to any subgroup. Spanish speakers preferred regular mail more than English speakers did.

Participants broadly agreed that more information, specifically from SSA, would be welcome. The questionnaire shows that 76 percent of participants trust SSA somewhat or very much to provide them with useful information about planning for retirement, more than report trusting other government agencies (54 percent), private institutions such as banks and investment companies (58 percent), and financial advisors (54 percent; not shown).

Discussion

Our study contributes to the understanding of what Hispanics know about Social Security and how they prefer to receive program-related information. We provide qualitative evidence of the types of questions, concerns, and biases Hispanics have regarding Social Security. We explore whether there are substantial differences among Hispanic ancestry subgroups and between Spanish speakers and English speakers.

In the questionnaire results, we find differences across the ancestry and primary-language subgroups in knowledge of selected aspects of Social Security benefits. For example, 82 percent of Mexican partici-pants knew that survivor benefits may go to children, compared with 76 percent of Cuban participants and 73 percent of Puerto Rican participants. Ninety-six percent of Puerto Rican participants knew that benefit amounts are affected by claiming age, compared with 70 percent of Mexican participants and 65 percent of Cuban participants. These examples also indicate that there is no clear pattern across the ancestry subgroups in program and benefits knowledge. That is, Puerto Ricans (for example) are not the most knowledgeable about each program aspect, nor are Cubans the least knowledgeable. The program-knowledge rankings of the ancestry subgroups vary from one aspect to another. However, a clearer pattern emerges across the primary-language subgroups, with English speakers being more knowledgeable than Spanish speakers on most aspects.

We find that the ancestry and primary-language subgroups were similar in their three most-preferred ways of receiving information about Social Security:

email, regular mail, and the SSA website. However, the ranking of those three modes varied across ances-try and language subgroups. Cubans most preferred to receive information about Social Security by mail, Puerto Ricans preferred email, and Mexicans preferred using the SSA website. English-speaking Hispanics preferred receiving Social Security infor-mation through the SSA website or email, while Spanish-speaking Hispanics preferred to receive Social Security information through email or regular mail. Other sources, such as webinars, in-person meetings/seminars, information posted in libraries or community spaces, and smartphone applications were less widely preferred. Finally, all three of the ancestry subgroups reported trusting SSA as a source of infor-mation more than any of the other sources (financial advisors, other government agencies, banks, nonprofit organizations, and, especially, the media).

One of the aims of this study was to provide insights into the best ways to reach Hispanic groups, to provide them with information on Social Security, and to help them prepare for retirement. Our focus groups revealed both similarities and differences across ancestry and primary-language subgroups in Social Security knowledge and preferred ways of receiving program information. For example, our results suggest that all of the subgroups prefer email, regular mail, and the SSA website—typical information sources. However, the content of the information provided might need to be changed, or the emphasis adjusted, to address the concerns and knowledge gaps we identified across the subgroups. Our findings also suggest that there may be value in increasing Spanish-language outreach, given the apparent knowledge gap among Spanish speakers. With the ongoing growth of the U.S. Hispanic popu-lation, further research should explore how best to make important, relevant, and tailored information easily accessible to English- and Spanish-speaking Hispanics—and to those from different cultural backgrounds—to improve their retirement outcomes. These findings, if verified by further research using larger panels of participants selected using procedures that provide a representative sample of the Hispanic population, will be useful to SSA outreach efforts.

Notes

[1] The importance of providing Hispanics with information on Social Security was highlighted in a recent report that recommended creating a notification system to ensure that older Americans are aware of their Social Security, Medicare, and pension options (National Hispanic Council on Aging 2015).

[2] We use the terms "Mexican," "Puerto Rican," and "Cuban" to identify the cultural ancestry of Hispanics legally residing in the United States, regardless of whether they are American citizens or permanent residents or when they (or their ancestors) immigrated to the United States.

[3] "Hispanic" is an ethnic origin rather than a racial category; people who are Hispanic can be of any race.

[4] The Census Bureau includes Asian and Pacific Islanders with non-Hispanic whites. Measured against whites (excluding Asian and Pacific Islanders), Hispanics at age 65 can expect to live 2 years longer (Hummer and Hayward 2015, 21).

[5] The survey was conducted in both English and Spanish from Oct. 20 to Nov. 18, 2013, by GfK Custom Research, Inc. Its 1,023 respondents self-identified as Hispanic, were 25–70 years old, had a household income of $25,000 or more, and had a role in household decision-making. General-population statistics are from the 2010 U.S. Census and from previous Prudential Research surveys.

[6] The NCLR also says that lower wealth may explain why Hispanics with retirement accounts are more likely to take early withdrawals or loans against them because of financial hardship, which amounts to a form of account leakage that may reduce retirement security.

[7] Conversely, MassMutual Financial Group (2013) argued that Hispanics are more serious about their financial futures and engage in more careful retirement planning than other groups. (See also PlanSponsor 2015.) Forbes Consulting Group conducted the survey for MassMutual in February 2013 via an online questionnaire. Respondents included men and women aged 25–64 who make (or participate in) financial decisions from among 1,337 households with children younger than 18. The study focused on Hispanics with annual household incomes of more than $75,000. Such respondents might be more concerned about (or able to plan for) their financial futures than are those with lower incomes. In 2014, 25 percent of Hispanic households had incomes of $75,000 or more (DeNavas-Walt and Proctor 2015, Table A-1).

[8] The Wells Fargo study is based on a nationwide online survey of 528 Hispanic investors conducted June 12–24, 2014. Qualified respondents were nonstudents aged 25–75 who were the primary or joint financial decision-maker in a household with investable assets of at least $10,000. The survey also included a national comparison sample of 530 general-population investors.

[9] By comparison, among non-Hispanic white Social Security beneficiaries aged 65 or older, 20 percent of married couples and 41 percent of unmarried persons relied on Social Security for 90 percent or more of their retirement income in 2014.

[10] In 2014, the median earnings of working-age Hispanics who worked full-time year-round were about $31,760, compared with $44,000 for all working-age people (SSA 2016b).

[11] We use the terms "whites" and "blacks" to refer to non-Hispanic individuals; as noted earlier, "Hispanics" may be of any race.

[12] UAS16 is one of two Social Security–related UAS surveys designed and fielded annually. It focuses on what Americans know about Social Security. The other survey, UAS26, focuses on Americans' preferred ways of receiving information about Social Security. Our study uses the 2015 versions of UAS16 and UAS26. For more information on the UAS, see https://cesr.usc.edu/data_toolbox /understanding_america_study. At the time of the 2015 surveys, the Internet panel comprised about 2,500 participants.

[13] Response options to these questions were "very knowledgeable," "somewhat knowledgeable," "not too knowledgeable," and "not at all knowledgeable."

[14] Using Survey of Consumer Finances data, Olsen and Whitman (2007, Table 4) likewise found that Hispanics are less likely than other population groups to use formal advisors for savings and investment advice.

[15] Facts 'N Figures—a market research firm that specializes in working with the Hispanic community—recruited our focus group participants, who were paid $100 for attending. We obtained consent during recruitment and again, verbally, at the outset of the group discussions.

[16] Participants were given a questionnaire in their primary language.

[17] For more information, see https://www.socialsecurity .gov/planners/retire/agereduction.html.

[18] For more information, see https://www.socialsecurity .gov/oact/tr/2013/tr2013.pdf (Table V.C7, page 145).

[19] For more information, see https://www.socialsecurity .gov/pubs/EN-05-10070.pdf.

[20] For more information, see https://www.socialsecurity .gov/planners/retire/applying5.html.

[21] For more information, see https://www.socialsecurity .gov/oact/tr/2013/tr2013.pdf (Figure II.D2, page 12).

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Exits from the Disability Insurance Rolls: Estimates from a Competing-Risks Model

by Lakshmi K. Raut*

This article explores the causes of growth in the number of disabled workers on the Social Security Disability Insurance (DI) rolls from 1980 through 2010 by estimating the probability of a DI beneficiary's program exit because of recovery, death, or conversion to retired-worker beneficiary, by sex, age, and disability type. Using Social Security administrative data and a competing-risks model to estimate DI exit probabilities, I find that death is the primary reason for program exits among nearly all beneficiary subgroups during their first 9 years on the rolls. Relative to men, women have lower probabilities of exit because of death; younger women also have lower exit probabilities because of recovery. From the 1980s to the 1990s, the probability of exit because of death declined while the probability of exit because of recovery did not improve. Beneficiaries with certain impairments are noteworthy exceptions to these general outcomes.

Introduction

For the Social Security Disability Insurance (DI) program, the numbers of new enrollments and of beneficiaries on the rolls rose rapidly from 1980 through 2010. Clearly, growth in the DI rolls can result when the number of enrollments increases; but it may also result when beneficiaries stay longer in the program. Possible contributing factors include (1) demographic shifts, such as growing shares of younger and female workers entering the rolls; (2) changes in DI policies and in economic conditions (such as high unemployment) influencing workers to enter the program and stay longer in it; and (3) changing health trends, with certain disabling impairments (such as musculoskeletal impairments and mental disorders) becoming more prevalent among various population subgroups. A beneficiary's stay on the DI rolls also depends on individual characteristics such as the type of disability, age at entitlement, sex, employment opportunities, and past health conditions. Available administrative data do not have information on many of these individual characteristics. In this article, I focus on exit-rate patterns by age and sex, by type of disability, and over time, to examine if workforce shifts toward relatively younger workers, more female workers, or more aging workers prone to certain types of disabilities might explain the observed growth in the DI rolls.

A DI beneficiary exits the program for one of three reasons—death, recovery, or conversion to retirement benefits at full retirement age (FRA). A recovery—leaving the program before death or old-age conversion—can be due either to a worker's return to employment that provides a substantial level of earnings or to a Disability Determination Service finding that a beneficiary is no longer disabled. This article does not distinguish between the two.

The probability of exit because of a given cause depends on the probabilities of exit resulting from the competing causes. For instance, the probability of exiting DI because of recovery within a certain time depends on the likelihood that the person did

Selected Abbreviations

CWHS	Continuous Work History Sample
DI	Disability Insurance
FRA	full retirement age

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not exit the program earlier because of either death or conversion. Thus, it is important to estimate the exit probabilities of any specific cause jointly with the exit probabilities of the two competing causes. Otherwise, we will have biased estimates (see, for instance, Pintilie 2006). I use a competing-risks statistical method that estimates the exit probabilities for all three competing risks simultaneously. Using these estimates, I present the emerging patterns of DI program exits by age at entitlement, sex, type of disability, and time on the rolls.

A parametric or semiparametric competing-risks hazard model is more appropriate than a cell-frequency method to estimate exit probabilities for two reasons. First, as cells are divided more finely to enhance granularity, some of them may end up containing zero or very few observations. A semiparametric hazard model can handle the small-sample cell problem because it uses information from all cells to estimate parameters that are common to all cells, while the cell-frequency method generally uses a case-by-case graduation method that combines the nearby cell frequencies. The second reason is that a semiparametric duration model can better handle censored observations, which arise because some individuals in the dataset have not yet exited the program at the time of data collection. The censored observations carry useful information about the exit probabilities, and estimates that discard the censored observations are inefficient.

This article is arranged in eight sections, including this introduction. In the second section, I briefly describe the trend of increasing DI entitlements and the data and methodology used in this analysis. In the third section, I first calculate the cumulative incidence of exit because of death, recovery, or conversion for the whole pool of disabled beneficiaries. Then I distinguish beneficiaries by age at entitlement and sex, focusing on beneficiaries who are younger than the FRA, and are thereby at no risk of exit by conversion; so for them, I examine only the probabilities of exit because of recovery or death. I look at exit probabilities by age at entitlement alone, and then by both age and sex. In the fourth section, I compare the estimates from the competing-risks model with direct estimates based on a cell-frequency method published in a Social Security Administration Actuarial Study (Zayatz 2011), first by age alone and then by age and sex. In the fifth section, I analyze how the exit patterns vary among five broad disability-type categories. In the sixth section, I examine how the exit probabilities for each disability type vary by sex. In the seventh section, I analyze how the

exit probabilities for each disability type have shifted over time. The eighth section concludes.

Background, Data, and Methodology

This section discusses the historical context and the analytical framework of the study.

Growth in the DI Rolls

Chart 1 shows the number of male and female disabled-worker beneficiaries on the DI rolls and the number of DI awards to male and female workers during the period 1986–2009. The data are from Zayatz (2011, Tables 3 and 6). All four series increase over time. The number of beneficiaries on the rolls depends on the number of new enrollments and the number of existing beneficiaries who had not exited the program in that year. The latter quantity is indicated in Chart 1 by the vertical distance between the two blue lines (for men) and the two red lines (for women).

The number of awards and the number of continuing disabled-worker beneficiaries have grown over time for both men and women. The growth rates were higher for female beneficiaries, although the difference by sex in the number of beneficiaries on the rolls had almost leveled off by 2009. What factors determined the growth of DI enrollment?

For the study period, I assume that in a given year, all new DI entitlements occur at the beginning of the year and that all exits occur at the end of the year. For year t, I denote by $N_t^{\chi, dt, a}(\tau)$ the number of disabled-worker beneficiaries on the rolls with characteristics χ, age at DI entitlement a, disability type dt, and duration on the rolls τ. Although the characteristics variable χ in this article indicates the beneficiary's sex, it can be multidimensional to incorporate ethnicity, religion, education level, and country of origin. The disability-type variable dt corresponds to the body-system categorizations used in the administrative data. The age variable a takes values from 20 to FRA. I use the more compact notation $\alpha = (\chi, dt, a)$ to refer to a combination of characteristics χ, disability type dt, and age a. In this notation, $N_t^{\alpha}(0)$ is the number of disabled-worker enrollments of type α in year t. Let $q_{c,t}^{\alpha}(\tau)$ be the probability of a DI disabled-worker beneficiary of type α in current-payment status who, after being in the program for τ years, exits the program in period t because of cause c (any of the three reasons for exit). I denote by

$$q_t^{\alpha}(\tau) = \sum_c q_{c,t}^{\alpha}(\tau)$$

Chart 1.
DI enrollments and beneficiaries on the rolls, by sex: 1986–2009

Number (in millions)
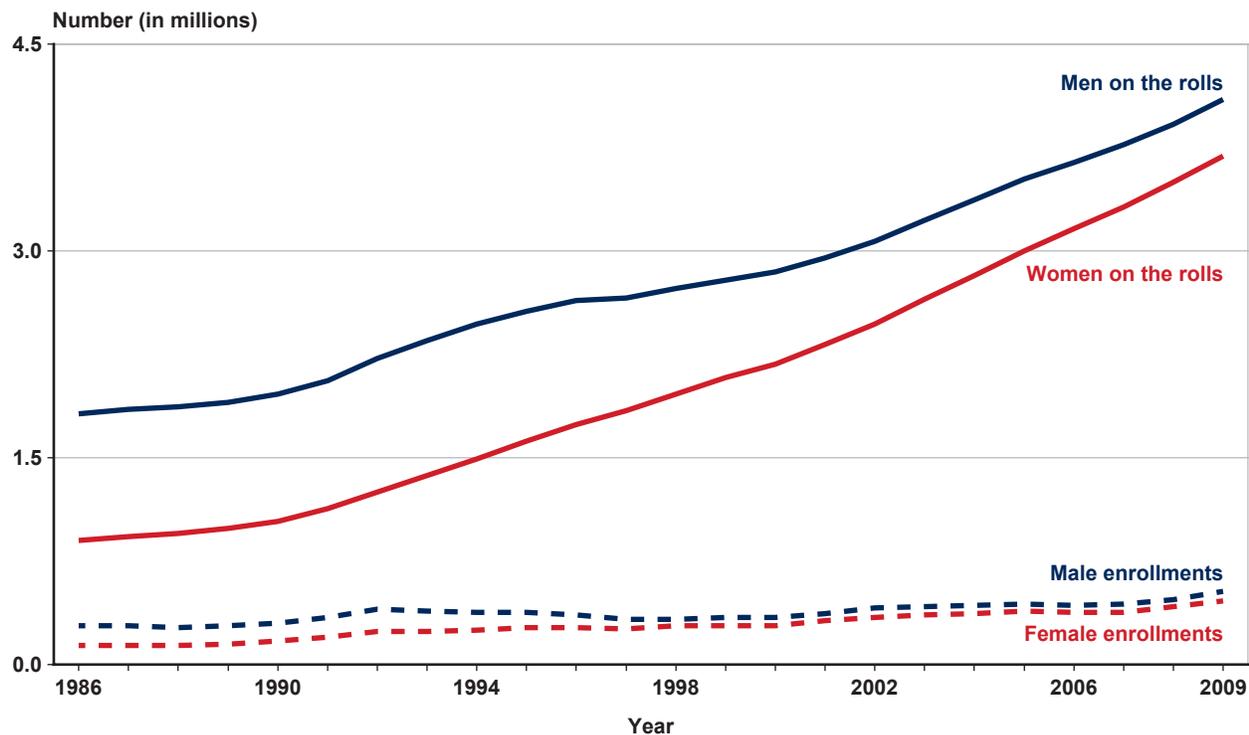
SOURCE: Zayatz (2011, Tables 3 and 6).

the probability of a disabled-worker beneficiary of type α in current-payment status who, after being in the program for τ years, exits the program in period t for any of the three competing exit risks. We have for a type $\alpha = (\chi, dt, a)$ beneficiary,

$$N_t^\alpha(\tau) = I_t^{\chi,a} \cdot r_t^\alpha$$

for $\tau = 0$ and

$$N_t^\alpha(\tau) = N_{t-1}^\alpha(\tau-1) \cdot \left(1 - q_{t-1}^\alpha(\tau-1)\right)$$

for $\tau = 1, 2, \ldots, \text{FRA} - a$, where $I_t^{\chi,a}$ is the insured population with characteristics χ and age a in period t who have not been on the DI rolls before and r_t^α is the probability of an insured worker of characteristics χ and age a entering the DI program with disability type dt in year t. Note that of the DI enrollees $N_t^\alpha(0)$ in year t,

$$N_t^\alpha(0) \cdot \left(1 - q_t^\alpha(0)\right)$$

will remain beneficiaries in year $t+1$, and

$$N_t^\alpha(0) \cdot \left(1 - q_t^\alpha(0)\right)\left(1 - q_{t+1}^\alpha(1)\right)$$

will continue to be beneficiaries in year $t+2$, and so on. As the magnitudes of the exit probabilities $q_t^\alpha(\tau)$

decline, the numbers of continuing beneficiaries over longer periods increase in the future. Moreover, because of shifts in the age distribution of the population or in the labor-force participation rate, if the number of disabled-worker beneficiaries of type $\alpha = (\chi, dt, a)$ with smaller exit probabilities $q_t^\alpha(\tau)$ over time increases, the number of continuing beneficiaries will be higher. This will be true even if there is no growth in the number of entitlements. For instance, assume that the 1946–1964 baby boom resulted in a relatively high proportion of young workers in the 1980s, and assume that relatively younger workers who became disabled were more likely than workers overall to have types of disabilities with relatively low exit probabilities. Alternatively, suppose that some changes in the labor market, such as increases in the shares of women who are disability-insured (as occurred in the 1980s) led to increases in disabled-worker entitlements for women, whose exit probabilities are lower than men's. In each case, the DI rolls increase more rapidly than they would in the absence of those trends, producing a ripple effect of yet larger increases in the rolls in subsequent years. These scenarios could partially explain why Chart 1 shows

the rolls rising after the 1980s. To find out if this is the case, it is important to compute the exit probabilities $q_t^\alpha(\tau)$ and the factors that affect the exit probabilities for various types $\alpha = (\chi, dt, a)$ of worker beneficiaries on the DI rolls.

Changes in DI policies, in the macroeconomic environment (especially the unemployment rate and income distribution patterns), in the epidemiology of the disabling impairments, and in women's labor market participation and insured status are all important determinants of the growth in the DI rolls. Developments in medical technology and demographic shifts resulting from the aging of the baby boom generation likewise play important roles. Although most of these factors take effect gradually, changes in DI policies and in unemployment rates can create immediate incentives for insured workers to apply for DI benefits or discourage current DI beneficiaries from returning to work. Individual responses to such changes will lead to immediate jittery effects on the DI incidence rates r_t^α and hence on the number of new DI entitlements (Chart 2).

The 1980 Social Security Disability Amendments tightened the eligibility criteria for DI benefits, resulting in decreases in the number of disabled-worker entitlements in the years preceding the period covered in the chart. That downward trend was somewhat mitigated by 1984 amendments that extended DI eligibility to individuals with certain mental impairments and added eligibility criteria based on multiple impairments. The recession of 1990–1991 caused high unemployment that led immediately to sharp growth in the number of new disabled-worker entitlements. A strong economic recovery during 1995–2000 and a provision of 1996 DI amendments that disallowed benefits for individuals with a primary diagnosis of drug and alcohol abuse lowered award growth rates. The number of DI awards grew during the recession of 2001 and accelerated again during the Great Recession of 2008–2009.

Autor and Duggan (2006) suggest that growing income disparity since 1980 has raised the DI replacement rate—the portion of predisability income that DI benefits replace—for poorer workers, thus creating higher incentives for them to enter the DI rolls. In an earlier study, I estimated the effects of DI policy changes, the aggregate unemployment rate, a worker's nonemployment history, and the DI replacement rate on the incidence rate r_t^α of the first DI

entitlement among insured workers (Raut 2011). I will not estimate those incident rates here. In this article, I estimate the DI exit probabilities $q_t^\alpha(\tau)$ for various groups $\alpha = (\chi, dt, a)$. Policies designed to encourage disabled-worker beneficiaries to return to work, such as the 1999 Ticket To Work initiatives, have not induced many program exits. I do not control for those policy effects in the current estimates.
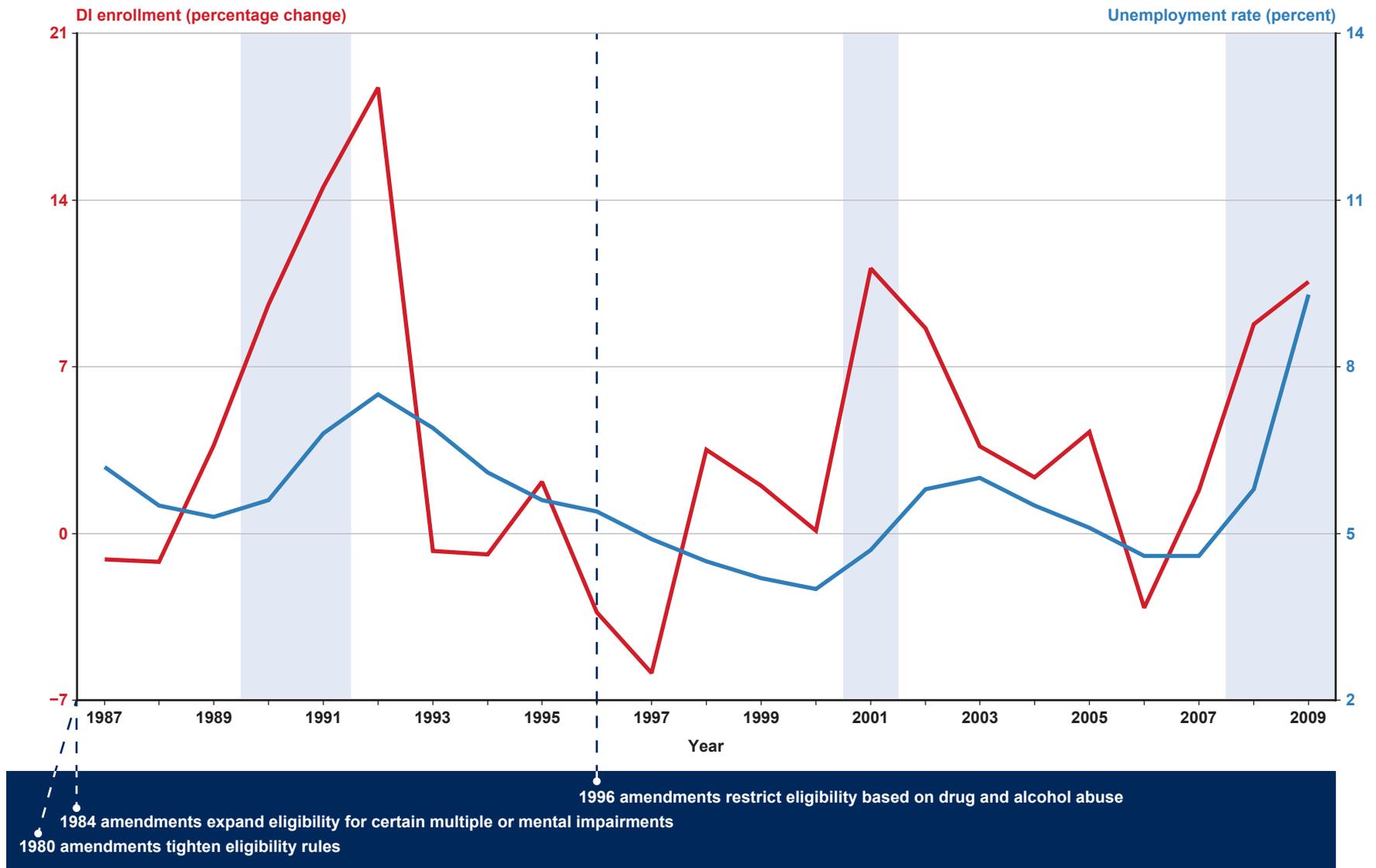
Data

The data for this study come from the 2008 Continuous Work History Sample (CWHS), which is a Social Security administrative file comprising a 1 percent random sample of all workers insured under Old-Age, Survivors, and Disability Insurance.[1] The CWHS contains information on the dates of DI entitlement and termination and on the reason for termination, but it does not record the date of disability onset or the type of impairment. As the best available approximation of the date of disability onset, the age at DI entitlement is used in this analysis. For information on the type of disability, I merge impairment data from administrative records known as 831 data files for entitlements from 1977 through 2006. (I use 2006 rather than 2008 as the cutoff because the CWHS requires 2 years to update the disability-related information fully. I also restrict the sample to individuals who were entitled in or after 1980.)

The CWHS for 1980–2006 contained data for 157,237 disabled-worker beneficiaries, of which 6 percent recovered, 28 percent died, 24 percent converted to retired-worker benefits because they reached FRA, and 42 percent were still on the rolls at year-end 2006. Therefore, of those who exited the program, 10 percent recovered, 48 percent died, and 42 percent retired. As estimates of exit probabilities, those figures would be biased because the individuals who exited the program during the study period do not compose a random sample. Instead, that sample overrepresents disabled individuals who were entitled during the early years of the study period and those with impairments that are more likely to lead to early exits. To compensate for those biases, it is important to incorporate the information for individuals who are still on the rolls. A competing-risks statistical model enables that inclusion, as I explain later.

I consider five broad disability-type groupings: musculoskeletal impairments, mental disorders, cardiovascular impairments, neoplasms, and all other

Chart 2.
Year-over-year percentage change in DI enrollment compared with unemployment rate for workers aged 16 or older, 1987–2009

DI enrollment (percentage change)

Unemployment rate (percent)

1996 amendments restrict eligibility based on drug and alcohol abuse

1984 amendments expand eligibility for certain multiple or mental impairments

1980 amendments tighten eligibility rules

Year

SOURCES: Zayatz (2011, Table 3); Bureau of Labor Statistics.

NOTE: Shaded areas indicate economic recessions.

diagnoses. Information on primary diagnosis is available for only 108,360 of the 157,237 disabled workers in the merged sample. Chart 3 shows the percentage distribution of new entitlements by disability type for each year 1986–2006. The distributions in some years may have been affected by policy changes; for instance, analysts have suggested that changes in the mid-1980s loosened eligibility criteria for applicants with musculoskeletal impairments and mental disorders (Autor 2011; Autor and Duggan 2006; General Accounting Office 1997). Chart 3 does not reveal any striking changes in the distribution; however, its underlying data are not adjusted to account for the shifting age composition of the population over the period.

In the 1980s, disability incidence rates rose more rapidly for female workers and younger workers than they did for other workers (Raut 2011, Figure 3; Goss 2013, Figures 8 and 12–15). If those two groups exit the program because of death or recovery at lower-than-average rates, then the overall prevalence

and duration of DI continuation will be affected, as I examine later.

Methodology

I apply the competing-risks approach to estimate exit probabilities for all causes simultaneously.[2] If all disabled-worker beneficiaries in the data were observed until they exited because of death, conversion, or recovery, the exit probabilities tabulated here would simply indicate what proportion of the starting sample had exited at each duration (1 year after entitlement, 2 years after entitlement, and so on) from one of the three causes. A basic problem with all such estimates is that the data are censored because at the end point (in this case, 2006), some of the beneficiaries have not yet exited for any of the three causes. One solution involves the use of hazard rates to estimate the probability of exiting at a given duration among those who remain on the rolls. The cause-specific hazard-rate estimates can be combined to calculate what the cumulative number of exits would have been

Chart 3.
Percentage distribution of DI enrollments by diagnosis type, 1986–2006
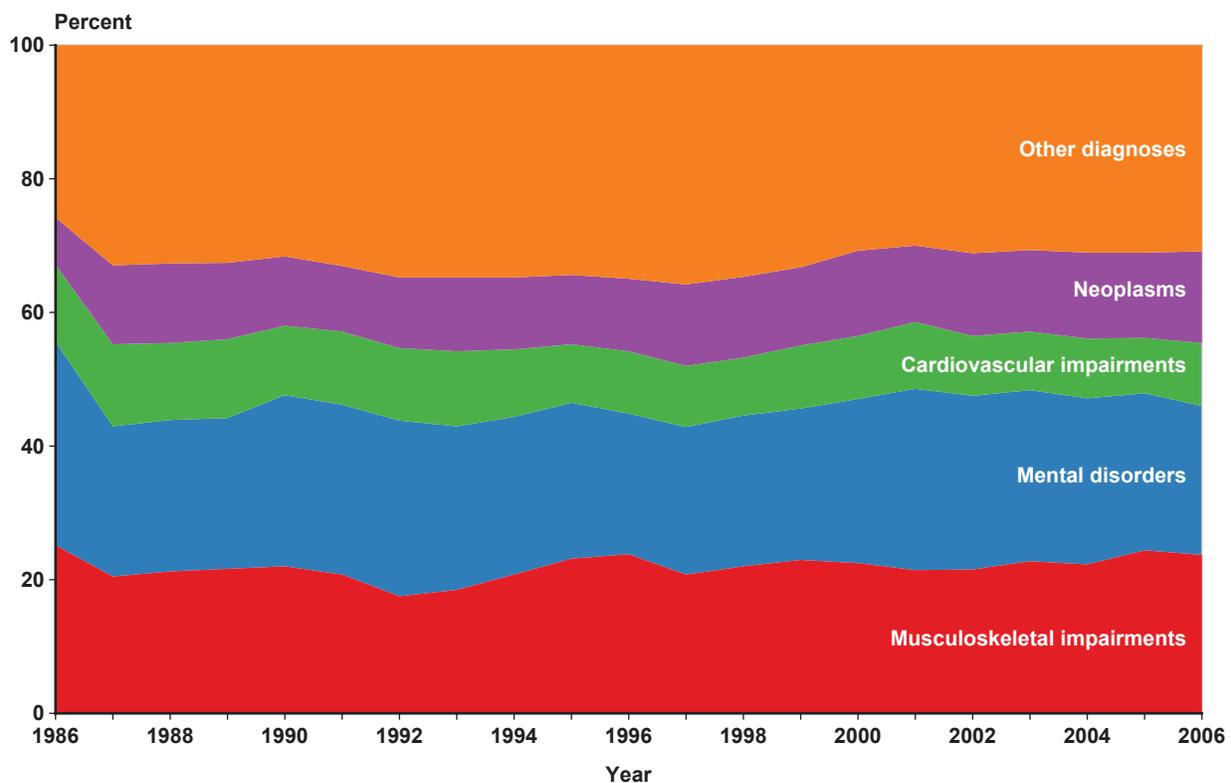
SOURCE: Author's calculations based on Social Security administrative records.

in the absence of censoring. When there are multiple causes, the hazard rates for the individual causes at each duration add up to the overall hazard rate at that duration. In the case of disabled-worker beneficiaries, in which everyone ultimately exits through one of the three causes, the cumulative share of beneficiaries who exit the program will eventually reach 100 percent; likewise, the sum of the cumulative exits from recovery, death, or conversion will also reach 100 percent.

Let $\lambda_c(t)$ be the hazard rate of exiting the program at time t for cause c, where c represents recovery, death, or conversion to retired-worker benefits.[3] Let T be the random variable denoting the exit time, and let R be the random variable denoting the cause of exit. Let $S(t) = \text{Probability}(T \geq t)$ be the survival function—that is, the probability of surviving to time t, $t > 0$. The *cumulative incidence function* $I_c(t)$ is the probability of exiting the program at time t or earlier for cause c, which is formally defined as

$$I_c(t) = \text{Probability}(T \leq t, R = c) \ = \ \int_0^t \lambda_c(u)S(u)du.$$

The estimation procedure of this analysis assumes a nonparametric distribution for $I_c(t)$ for all c and applies the maximum-likelihood estimation procedure. In the present context of discrete yearly data, the maximum-likelihood estimators for the cumulative incidence functions become

$$I_c(t) = \sum_{j:t_j \leq t} \frac{d_{cj}}{n_j} S(t_{j-1}),$$

where d_{cj} = number of exits at time t_j for cause c, n_j is the number of people at risk at time t_j, and $S(t_{j-1})$ is the Kaplan-Meier estimate of the survival function at time t_{j-1}. Note that in our three competing-risks cases, we have

$$\sum_c I_c(t) = 1 - S(t), \text{ for } t = 1, 2, \ldots, \text{and } S(0) = 1.$$

This equation is used to estimate the survival function $S(t)$ recursively. Notice that the competing-risks estimator of the cumulative incidence function $I_c(t)$ depends not only on the number of individuals who exited the program for cause c but also on the number of individuals who have not exited.

In his actuarial study, Zayatz (2011) uses cells for each age-sex-duration combination, measuring age and duration of stay on the program in years. He calculates the hazard rate of exits because of recovery, death, or conversion to retired-worker benefits by age and sex during the 5-year observation period of January 1, 2001 through December 31, 2005. Because

of data limitations noted earlier, I restrict my analysis to beneficiaries in the CWHS 1 percent sample who were entitled to DI from 1980 through 2000. Zayatz uses administrative data from the Master Beneficiary Record, which has information for all DI beneficiaries who were entitled to DI benefits at any time in the past and are on the program rolls during the observation period.

With that dataset, covering the entire population of 11.9 million beneficiaries, Zayatz is able to estimate the exit probabilities for each cause and for yearly ages at entitlement. With far fewer observations available, I am limited to estimating the exit probabilities for broader age-at-entitlement groups.

Recall the notation $\alpha = (\chi, dt, a)$, in which χ represents sex, dt represents the disability type (for Zayatz, all types are combined), and a represents age at entitlement. Zayatz assumes that the exit probabilities are constant over the observation period, $q_{c,t}^\alpha(\tau) = q_c^\alpha(\tau)$, as do I. In the discrete time framework of this analysis (with each year as the unit of time), his cell-frequency method is equivalent to calculating $q_c^\alpha(\tau)$ as the ratio of the number of beneficiaries of type α with τ years on the rolls who exited for cause c within a given year in the observation period to the number who were at risk of exiting. For the cells with sparse underlying data, he uses the Whitaker-Henderson two-dimensional graduation method to combine information from the nearby cells. In his dataset, however, the dates of birth, entitlement, and exit are specific days, not years. In the technical appendix to his study, he describes how he adjusts the dates to produce yearly exit-probability estimates:

> The availability of complete data on each person in the study (sex, date of birth, date of entitlement, date of decrement, and cause of decrement) allows for direct estimation of the *multiple-decrement probabilities* $q^{(i)}$, where i represents the cause of decrement. Each unit age interval $(x, x+1]$ represents one life-year of potential exposure. For each interval that an individual is under observation, the person enters the interval at age $x+r, (0 \leq r < 1)$, and is scheduled to exit the interval at age $x+s, (0 < s \leq 1)$. Note that $r = 0$ except for instances where the beginning of the observation period falls within the age interval. Similarly $s = 1$ except for instances where the end of the observation period falls within the interval. Clearly, $s - r$ is the amount of time that the person is scheduled

to be exposed to the risks of decrement. The total *scheduled exposure* for an interval is obtained by summing over all persons. … Multiple-decrement probabilities are calculated by dividing the observed number of deaths or recoveries in an interval by the aggregate scheduled exposure for that interval (Zayatz 2011).

The cell-by-cell estimation of exit probabilities can be viewed as a nonparametric method that does not use information from other cells. However, if a cell in the sample has zero frequency of the event, the exit-probability estimate will be very imprecise.[4] On the other hand, a fully or partially parameterized statistical model treats probabilities as varying smoothly across cells by depending on few parameters to determine the cross-cell probabilities, and the statistical estimation procedure uses data from all cells to provide smoothly varying cell-to-cell probability estimates. The problem exists even when we have disability data for the whole population, not just a sample. This is because

disability incidence among an entire population is itself the realization of an epidemiological model that is presumably smooth.

Estimated Exit Probabilities

In this section, I estimate the DI exit probabilities of disabled-worker beneficiaries at three distinct levels of detail. First, I examine beneficiaries overall. Then, I examine exit-probability patterns by age at entitlement. Finally, I cross-tabulate the estimated exit probabilities by age at entitlement and sex.

Exit Patterns of the Overall Population

As noted earlier, this analysis is restricted to individuals who were entitled to DI disabled-worker benefits during 1980–2000. Chart 4 shows estimated exit probabilities by cause.[5] Table 1 presents the probabilities for selected durations. I estimate the overall probability that an individual would exit the program because of recovery as 0.08, which is very close to

Chart 4.
Cumulative probability of DI program exit, by reason and duration on the rolls
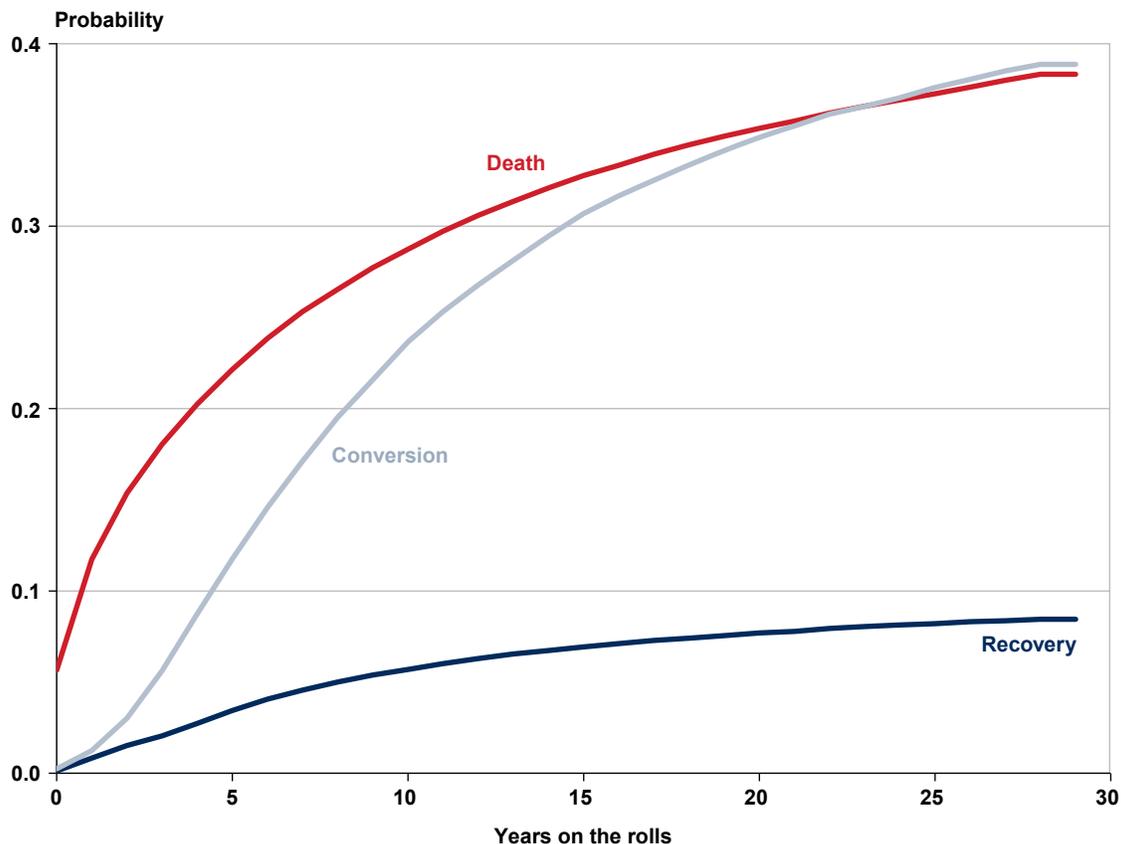
SOURCE: Author's calculations using Social Security administrative data and a competing-risks estimation model.

Table 1.
Cumulative probability of DI program exit within various periods since award, by reason

Years on the DI rolls	Recovery	Death	Conversion
0	0.0013	0.0565	0.0025
1	0.0084	0.1173	0.0125
2	0.0153	0.1536	0.0302
5	0.0345	0.2214	0.1176
10	0.0570	0.2874	0.2366
15	0.0694	0.3278	0.3069
20	0.0770	0.3536	0.3487
25	0.0821	0.3726	0.3760
29	0.0845	0.3833	0.3887

SOURCE: Author's calculations using Social Security administrative data and a competing-risks estimation model.

the observed proportion of 0.10. The estimated exit probabilities for death and for conversion to retired-worker benefits are 0.38 and 0.39, respectively. In other words, for disabled-worker beneficiaries in a given entitlement-year cohort, 8 percent would exit the rolls because of recovery within 30 years, 38 percent would die, 39 percent would convert to retired-worker benefits, and the remaining 15 percent would still be on the rolls. (These estimates assume a constant age, sex, and disability-type composition of beneficiaries on the rolls in each year from 1980 through 2000.) Table 1 and Chart 4 also show that during the first few years of entitlement, death is the leading cause of exit, conversion to retirement is the second leading cause, and the probability of recovery is very small. Within the first year, the probability of death is more than 20 times greater than that of conversion. In Chart 4, the plot of the cumulative probability of death starts at a much higher y-level corresponding to the duration 0 on the x-axis. We will see similar patterns for most of the plots by age at entitlement, disability type, and sex later in the article. Notable exceptions involve young beneficiaries with musculoskeletal impairments or mental disorders, who have significantly higher probabilities of recovering than of dying.

The competing-risks estimates in this section assume that all disabled-worker beneficiaries have the same exit risks, irrespective of their age at entitlement, type of disability, and year of disability entitlement. It would not be surprising if recovery probabilities are higher and death probabilities are lower at younger entitlement ages. We also can expect that some types

of impairment, particularly neoplasms, will have higher death rates, especially in the first few years after onset. Even the year of disability onset can affect the probabilities of recovery or death, as healthcare technology improves over time or as the health condition of program entrants changes in response to economic conditions or policy changes. I examine those factors later.

Exit Patterns by Age at Entitlement

Because the dataset is not large enough to provide reliable estimated probabilities by single year of age, I instead estimate them for four age-at-entitlement groups: 20–30, 31–40, 41–50, and 51–55. Conversion probabilities apply only to beneficiaries aged 65 or older; therefore, estimates are restricted to program exits because of death or recovery in the remainder of this analysis.

Chart 5 shows the estimated cumulative exit probabilities over the first 9 years of entitlement, and Table 2 shows the cumulative incidence probabilities by the end of 9 years in the program. Chart 5 shows

Table 2.
Cumulative probability of DI program exit because of recovery or death through the first 9 years on the rolls, by age at entitlement and sex

Age group	Recovery	Death	Either recovery or death
All			
20–30	0.1633	0.1285	0.2918
31–40	0.1087	0.2033	0.3120
41–50	0.0465	0.2688	0.3153
51–55	0.0138	0.3214	0.3352
Men			
20–30	0.1766	0.1425	0.3191
31–40	0.1155	0.2373	0.3527
41–50	0.0473	0.3031	0.3504
51–55	0.0131	0.3625	0.3756
Women			
20–30	0.1403	0.1041	0.2445
31–40	0.0984	0.1520	0.2504
41–50	0.0454	0.2229	0.2683
51–55	0.0147	0.2635	0.2782

SOURCE: Author's calculations using Social Security administrative data and a competing-risks estimation model.

NOTE: Probabilities by "either recovery or death" do not necessarily equal the sum of rounded probabilities for the separate causes.

Chart 5.
Cumulative probability of DI program exit because of recovery or death over the first 9 years on the rolls, by age at entitlement
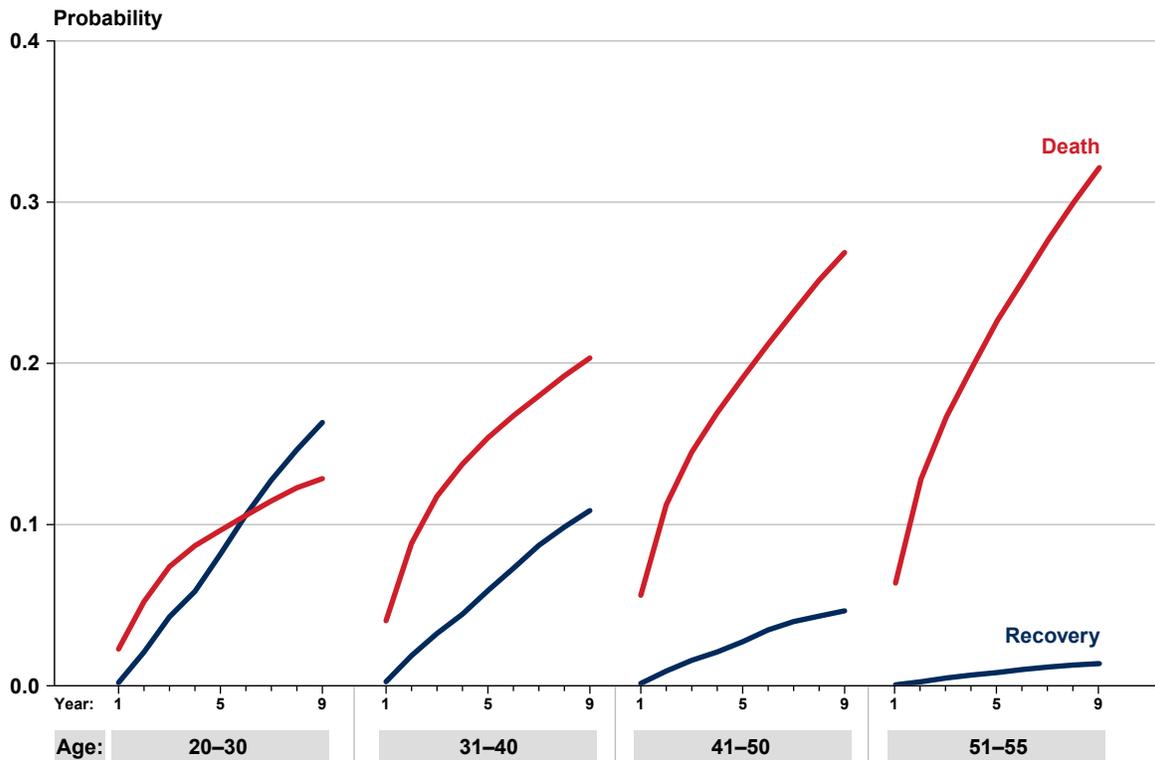
SOURCE: Author's calculations using Social Security administrative data and a competing-risks estimation model.

that death is the dominant cause of program exit for all age groups except the youngest in the latter stages of the 9-year period. The probability of death after a given period on the rolls increases with age at entitlement. The probability of recovery is comparatively high for entitlements at ages 20–30, but declines as age of entitlement increases. Table 2 shows that after 9 years on the rolls, the combined probability of exit for either of the two causes is 29 percent for the youngest age group and 34 percent for the oldest age group. The probability of recovery is 16 percent for the youngest group but only 1 percent for the oldest group. The death probabilities have the opposite pattern: A disabled worker entitled to DI at ages 20–30 has a 13 percent probability of death within 9 years in the program; one who was entitled at ages 51–55 has a 32 percent probability.

Exit Patterns by Age at Entitlement and Sex

Chart 6 plots the estimated exit probabilities over the first 9 years on the rolls by sex and shows that women exit the program because of death at lower rates than men in all age groups, and that recovery rates are lower for younger women than for younger men. For the two oldest age groups, recovery rates for men and women are almost identical.

Table 2 reveals similar patterns for cumulative incidence probabilities after 9 years in the program. Overall (that is, for either of the two competing causes), exit probabilities are higher for men than for women—and the differences are more prominent at older entitlement ages: 32 percent for men versus 24 percent for women in the 20–30 age group and 38 percent for men versus 28 percent for women in the 51–55 age group. That result indicates that the labor market developments in the 1980s contributed significantly to

Chart 6.
Cumulative probability of DI program exit because of recovery or death over the first 9 years on the rolls, by sex and age at entitlement
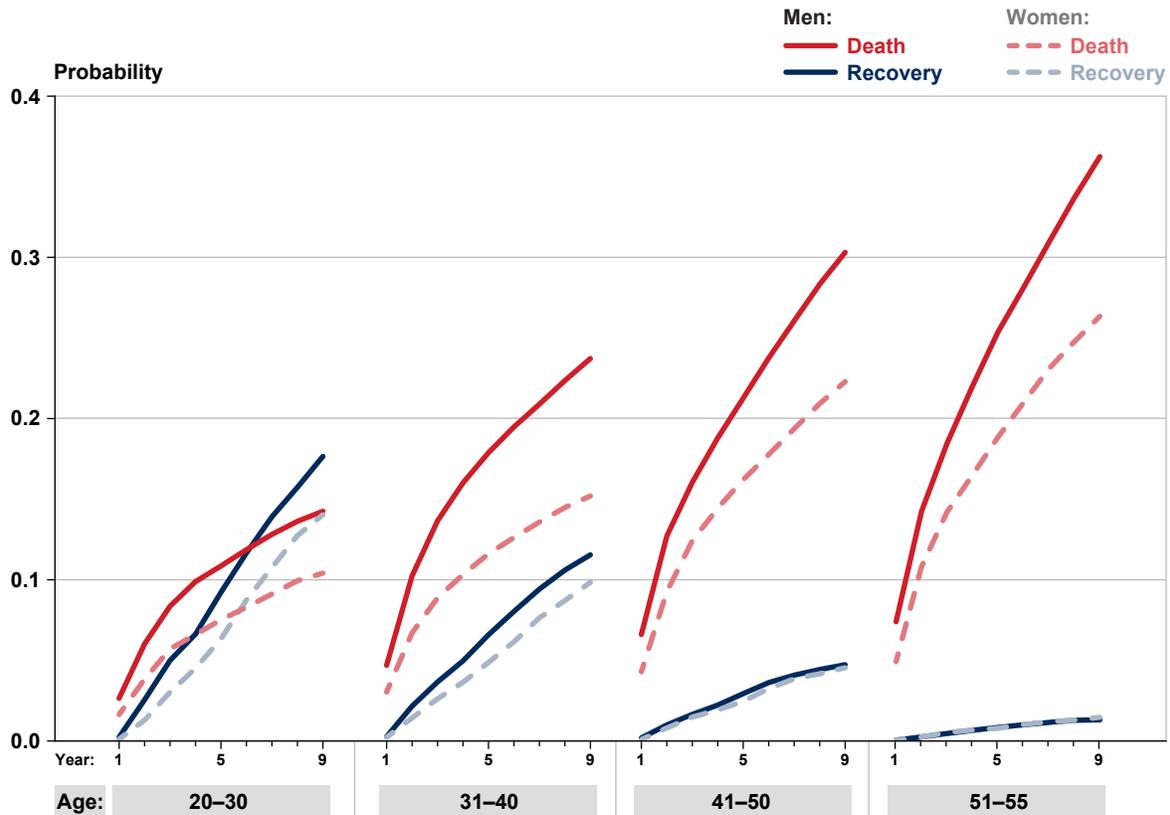
SOURCE: Author's calculations using Social Security administrative data and a competing-risks estimation model.

the growth in the rolls of DI disabled-worker beneficiaries, as female enrollment rapidly increased and many women remained on the rolls for longer periods because of their lower exit probabilities.

Comparing Competing-Risks Estimates with Direct Estimates

In this section, I examine how competing-risks model estimates compare with the direct cell-frequency estimates presented in Zayatz (2011).

Comparative Estimates by Age

As described earlier, Zayatz applies a direct method to estimate the exit probabilities attributable to death and recovery. He uses data from the Master Beneficiary Record and restricts his analysis to the individuals who exited the program during 2001–2005. He computes the hazard rates of exits as the ratio of the number of individuals exiting the program during a given period to the number of workers at risk during the period. However, the definitions of the risk sets in his study differ slightly

from those of this study (as detailed in the methodology section). Although Zayatz does not report cumulative incidence probabilities, I use his hazard-rate estimates to compute my cumulative incidence probabilities.[6]

Chart 7 plots the exit probabilities for death and recovery over the first 9 years on the rolls by estimation method and Table 3 provides the cumulative incidence probabilities through 9 years on the rolls for all, male, and female disabled-worker beneficiaries. The Zayatz direct estimates of the probability of exit because of death are slightly lower than the competing-risks model estimates, and the opposite is true for exits because of recovery, for almost all ages at entitlement. This discrepancy might stem from the use of different datasets and sample selection criteria in the two studies. Recall that this analysis restricts the years of disability entitlements to first awards in the period 1980–2000 and the observation period to 1980–2006; Zayatz considers any past years for as many as three entitlements and uses the 2001–2005 observation

Chart 7.
Cumulative probability of DI program exit because of recovery or death over the first 9 years on the rolls, by age at entitlement: Comparing competing-risks and direct estimates
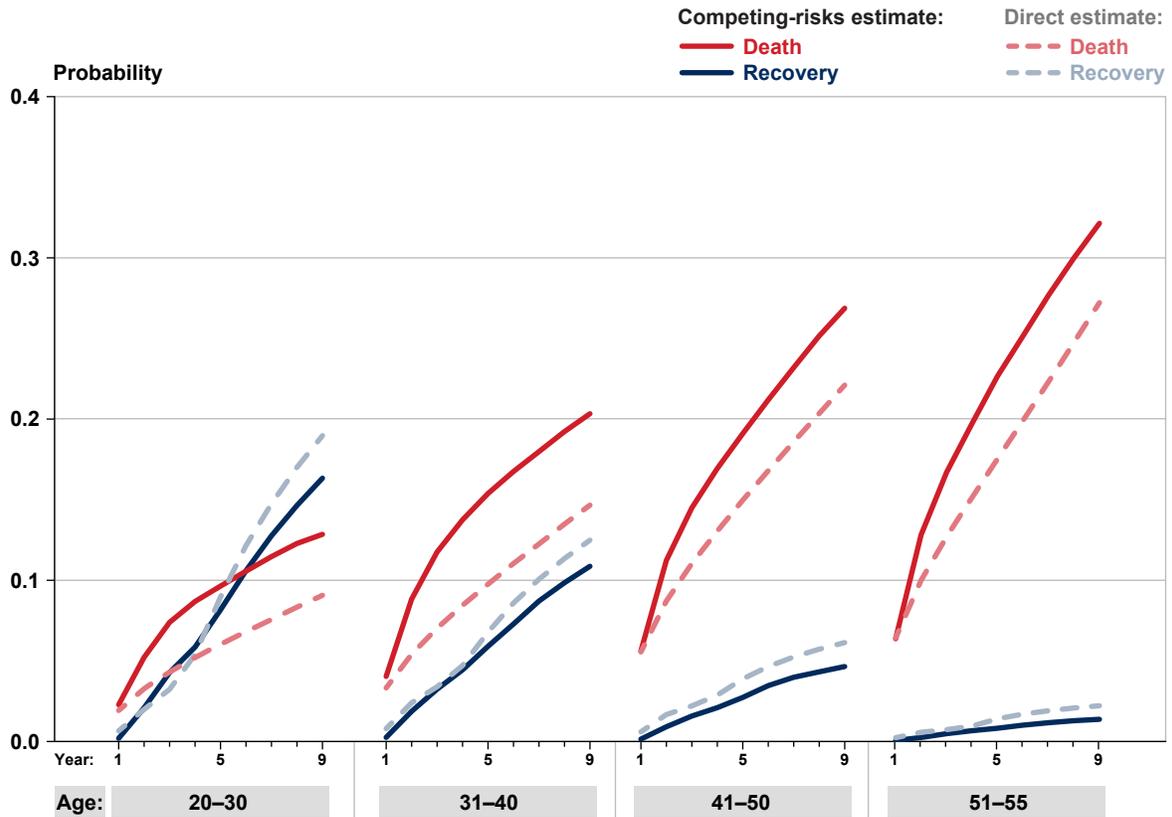
SOURCES: Author's calculations using Social Security administrative data and a competing-risks estimation model; Zayatz (2011).

Table 3.
Cumulative probability of DI program exit because of recovery or death through the first 9 years on the rolls, by age at entitlement and sex: Comparing competing-risks and direct estimates

Age group	Recovery		Death		Either recovery or death	
	Competing-risk estimates	Direct estimates	Competing-risk estimates	Direct estimates	Competing-risk estimates	Direct estimates
All						
20–30	0.1633	0.1897	0.1285	0.0907	0.2918	0.2804
31–40	0.1087	0.1249	0.2033	0.1466	0.3120	0.2715
41–50	0.0465	0.0613	0.2688	0.2211	0.3153	0.2824
51–55	0.0138	0.0222	0.3214	0.2722	0.3352	0.2944
Men						
20–30	0.1766	0.2022	0.1425	0.1021	0.3191	0.3042
31–40	0.1155	0.1348	0.2373	0.1703	0.3527	0.3052
41–50	0.0473	0.0623	0.3031	0.2570	0.3504	0.3194
51–55	0.0131	0.0215	0.3625	0.3131	0.3756	0.3346
Women						
20–30	0.1403	0.1769	0.1041	0.0790	0.2445	0.2559
31–40	0.0984	0.1146	0.1520	0.1218	0.2504	0.2364
41–50	0.0454	0.0604	0.2229	0.1833	0.2683	0.2437
51–55	0.0147	0.0228	0.2635	0.2292	0.2782	0.2520

SOURCES: Author's calculations using Social Security administrative data and a competing-risks estimation model; Zayatz (2011).

NOTE: Probabilities by "either recovery or death" do not necessarily equal the sum of rounded probabilities for the separate causes.

period. Another possible reason for the discrepancy is that exit probabilities during earlier years were in fact higher for death and lower for recovery than in later years (discussed later in this article).

Comparative Estimates by Age and Sex

Chart 8 plots, for men and women separately, the same results that Chart 7 shows for both sexes combined. For each age-sex group, the Zayatz direct estimates of the probability of exit for either cause are close to the competing-risks estimates.

Exit Probabilities by Disability Type and Age

Exit probabilities by type of impairment may foreshadow future trends for DI. Because older people have higher propensities to encounter certain types of disabilities such as neoplasms and cardiovascular impairments, differences in exit probabilities by disability type and age at entitlement can illuminate how the advancing age of the baby boom generation will affect the disability rolls.

Chart 9 plots the estimated exit probabilities during the first 9 years in the program. Table 4 reports the estimated cumulative incidence of exit because of recovery or death by the end of 9 years in the program. The exit patterns for the "other diagnoses" category are very similar to the patterns for all diagnoses combined that I discussed earlier and thus "all impairments" data are omitted from Chart 9 and Table 4. The estimates for cardiovascular impairments in the 20–30 age group should be interpreted with caution because they are drawn from a very small sample (86 observations).

For each disability type, recovery is more probable at younger ages and declines with each successively older age group. Recovery is the more probable reason for exit for the two youngest age groups with musculoskeletal system impairments and mental disorders. For the other three disability types, death is the most probable cause of exit at all ages; for neoplasms, death within the first few years is especially high. The cumulative probability of death rises with each successively older age group regardless of disability type.

Exit Probabilities by Disability Type, Age, and Sex

Earlier, I discussed the patterns by sex of exits for all impairment types combined (see Table 2 and Chart 6). In this section, I report the estimated cumulative incidence probabilities by disability type for each age-sex combination (Table 5 and Chart 10). The general patterns that we saw for all impairments combined are very similar to those for each disability type, with two exceptions. First, for cardiovascular impairments, women who were entitled at ages 20–30 had higher exit probabilities because of death than their male counterparts had.[7] Second, for neoplasms, the exit probabilities were strikingly similar for men and women regardless of cause and age at entitlement.

Two trends specific to women appear to have contributed to the sharp rise in the number of beneficiaries on the DI rolls from 1980 through 2010. First, the combined exit probabilities because of either recovery or death for women are lower than those for men, so women tend to stay longer on the rolls. Second, in the 1980s and 1990s, the labor force participation rate of women increasingly approached that of men, as did the number of women insured for DI; as a result, DI enrollments of women increased more quickly than men's enrollments during the period. Goss (2013) contends that part of the rapid growth in the DI rolls in the 1980s could be the sharp proportional rise in the percentage of women who entered the rolls during that period. Pattison and Waldron (2013) and Liebman (2015) elaborate on those trends.[8]

Exit Probabilities by Decade

In this section, I estimate exit probabilities by age at entitlement and disability type for two periods of entitlement: 1980–1989 and 1990–2000. Chart 11 plots the estimated exit probabilities during the first 9 years on the rolls and Table 6 reports the estimated cumulative probability of exit through 9 years in the program. (Chart 11 omits the plot for "other diagnoses" because it is very similar to that for all impairments; additionally, estimates for cardiovascular impairments in the 20–30 age group should be interpreted with caution because they reflect a small sample size.)

Chart 11 shows that from the 1980s to the 1990s, exits because of death became less common for all age groups and exits because of recovery did not improve except for ages 41–50. The former trend might be due to improvements in healthcare technology. The latter trend might reflect a shift in recent years among individuals aged 41–50 at entitlement toward impairments with lower mortality and higher recovery probabilities such as musculoskeletal impairments and mental disorders.
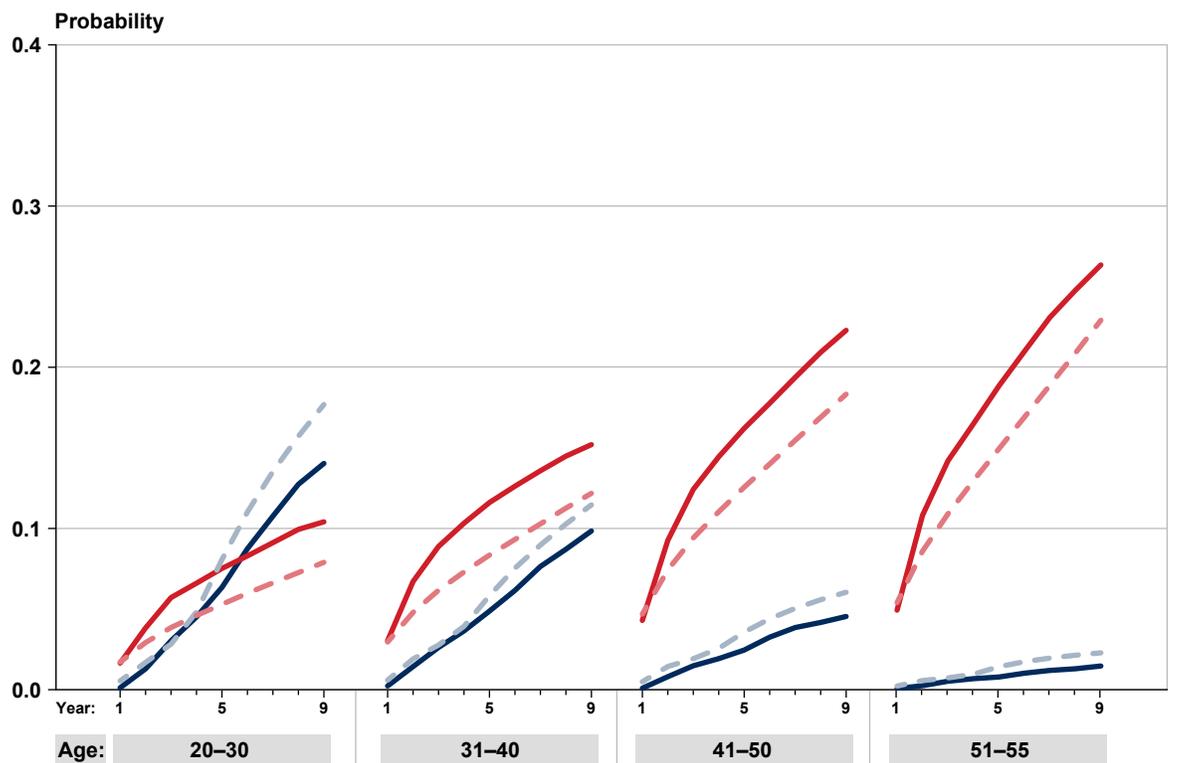
Chart 8.
Cumulative probability of DI program exit because of recovery or death over the first 9 years on the rolls, by sex and age at entitlement: Comparing competing-risks and direct estimates
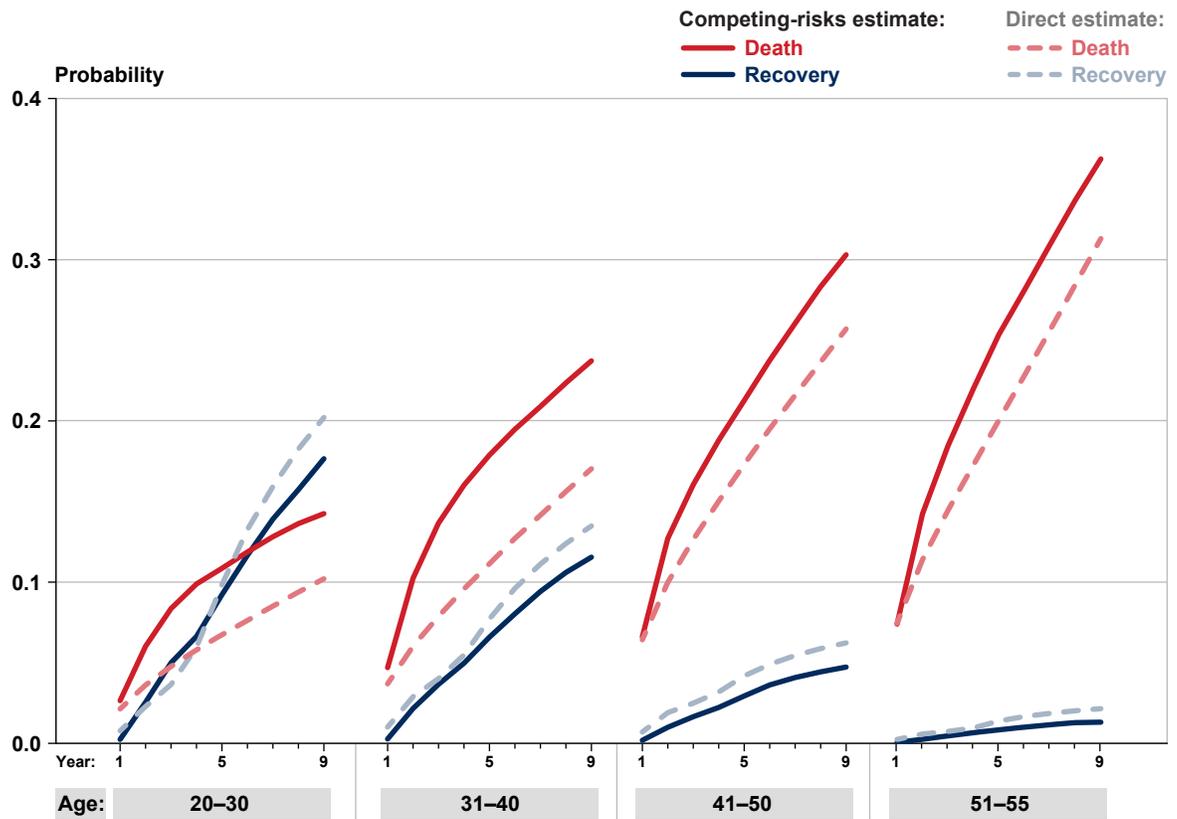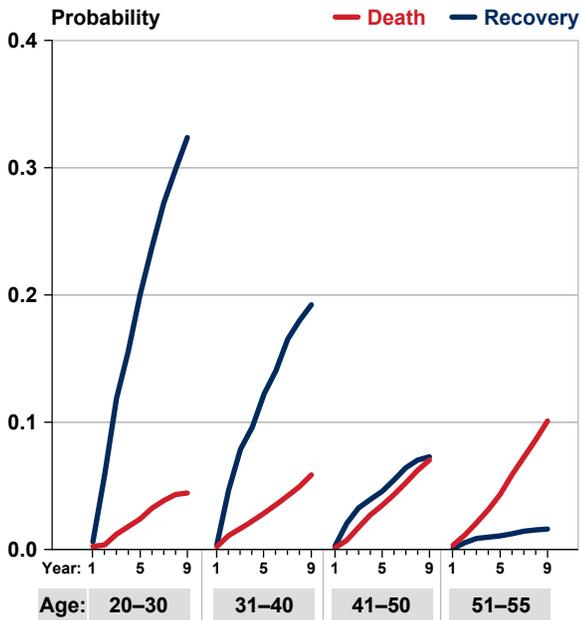

SOURCES: Author's calculations using Social Security administrative data and a competing-risks estimation model; Zayatz (2011).
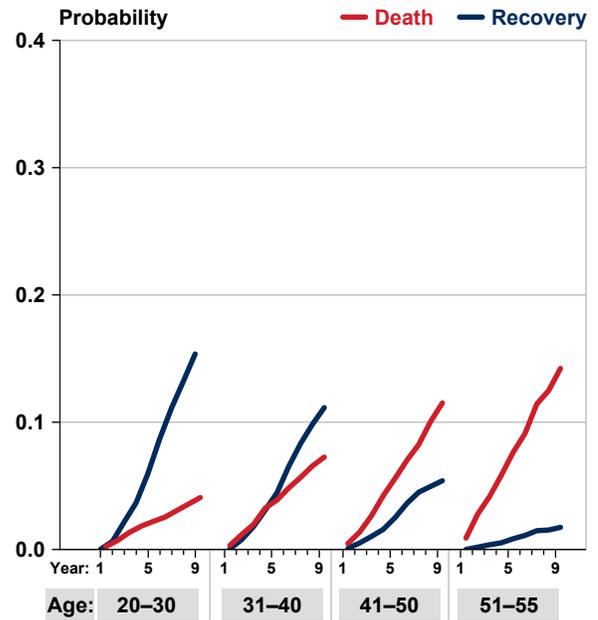
Chart 9.
Cumulative probability of DI program exit because of recovery or death over the first 9 years on the rolls, by selected disability type and age at entitlement
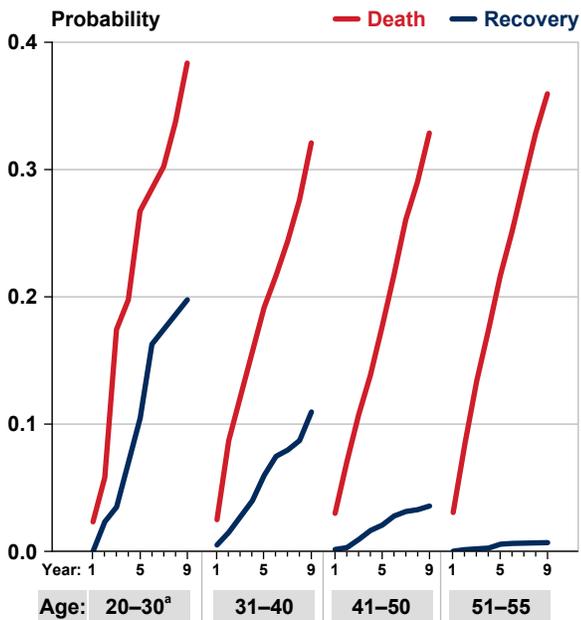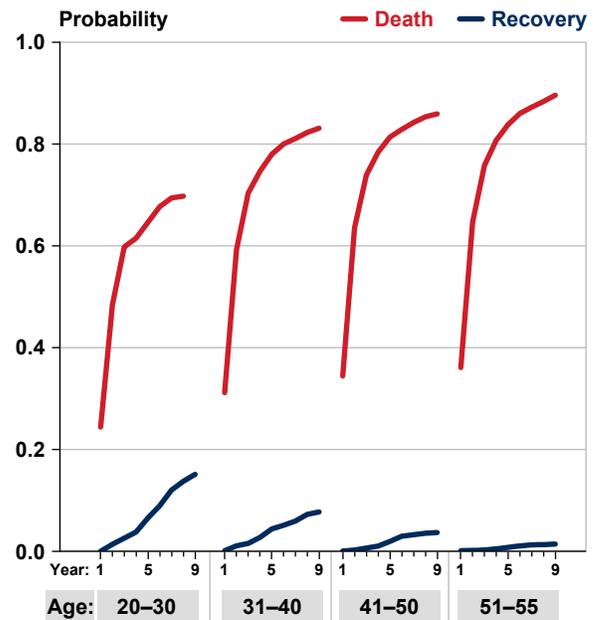

Panel A: Musculoskeletal impairments

Probability — Death — Recovery

Year: 1 5 9 1 5 9 1 5 9 1 5 9
Age: 20–30 31–40 41–50 51–55

Panel B: Mental disorders

Probability — Death — Recovery

Year: 1 5 9 1 5 9 1 5 9 1 5 9
Age: 20–30 31–40 41–50 51–55

Panel C: Cardiovascular impairments

Probability — Death — Recovery

Year: 1 5 9 1 5 9 1 5 9 1 5 9
Age: 20–30[a] 31–40 41–50 51–55

Panel D: Neoplasms

Probability — Death — Recovery

Year: 1 5 9 1 5 9 1 5 9 1 5 9
Age: 20–30 31–40 41–50 51–55

SOURCE: Author's calculations using Social Security administrative data and a competing-risks estimation model.

NOTE: The scale of the y-axis for Panel D (Neoplasms) differs from those of the other panels.

a. Estimates for this age group are drawn from a small sample (86 observations) and should be interpreted with caution.

Table 4.

Cumulative probability of DI program exit because of recovery or death through the first 9 years on the rolls, by disability type and age at entitlement

Disability type and age	Recovery	Death	Either recovery or death
Musculoskeletal impairments			
20–30	0.3237	0.0444	0.3681
31–40	0.1923	0.0586	0.2509
41–50	0.0728	0.0702	0.1431
51–55	0.0160	0.1009	0.1170
Mental disorders			
20–30	0.1536	0.0408	0.1944
31–40	0.1115	0.0726	0.1841
41–50	0.0540	0.1151	0.1691
51–55	0.0174	0.1423	0.1596
Cardiovascular impairments			
20–30 [a]	0.1977	0.3837	0.5814
31–40	0.1095	0.3209	0.4303
41–50	0.0355	0.3286	0.3641
51–55	0.0067	0.3594	0.3661
Neoplasms			
20–30	0.1512	0.6976	0.8488
31–40	0.0773	0.8312	0.9084
41–50	0.0369	0.8594	0.8962
51–55	0.0142	0.8960	0.9102
Other diagnoses			
20–30	0.1414	0.2500	0.3914
31–40	0.0772	0.3489	0.4260
41–50	0.0382	0.3548	0.3930
51–55	0.0094	0.3703	0.3797

SOURCE: Author's calculations using Social Security administrative data and a competing-risks estimation model.

NOTE: Probabilities by "either recovery or death" do not necessarily equal the sum of rounded probabilities for the separate causes.

a. Estimates for this age group are drawn from a small sample (86 observations) and should be interpreted with caution.

Table 5.
Cumulative probability of DI program exit because of recovery or death through the first 9 years on the rolls, by sex, disability type, and age at entitlement

Disability type and age	Recovery		Death		Either recovery or death	
	Men	Women	Men	Women	Men	Women
All impairments						
20–30	0.1766	0.1403	0.1425	0.1041	0.3191	0.2445
31–40	0.1155	0.0984	0.2373	0.1520	0.3527	0.2504
41–50	0.0473	0.0454	0.3031	0.2229	0.3504	0.2683
51–55	0.0131	0.0147	0.3625	0.2635	0.3756	0.2782
Musculoskeletal impairments						
20–30	0.3852	0.2028	0.0524	0.0285	0.4376	0.2312
31–40	0.2239	0.1351	0.0682	0.0412	0.2921	0.1762
41–50	0.0841	0.0572	0.0831	0.0524	0.1672	0.1097
51–55	0.0138	0.0188	0.1253	0.0706	0.1391	0.0893
Mental disorders						
20–30	0.1648	0.1344	0.0463	0.0313	0.2111	0.1657
31–40	0.1121	0.1106	0.0894	0.0505	0.2015	0.1611
41–50	0.0541	0.0539	0.1525	0.0741	0.2066	0.1280
51–55	0.0140	0.0211	0.1852	0.0945	0.1992	0.1157
Cardiovascular impairments						
20–30 [a]	0.1803	0.2400	0.3770	0.4000	0.5574	0.6400
31–40	0.1181	0.0916	0.3542	0.2519	0.4723	0.3435
41–50	0.0342	0.0390	0.3369	0.3065	0.3711	0.3455
51–55	0.0081	0.0024	0.3738	0.3164	0.3820	0.3188
Neoplasms						
20–30	0.1329	0.1780	0.6994	0.6949	0.8324	0.8729
31–40	0.0789	0.0759	0.8448	0.8192	0.9237	0.8951
41–50	0.0309	0.0425	0.8733	0.8462	0.9042	0.8887
51–55	0.0183	0.0092	0.9019	0.8889	0.9203	0.8980
Other diagnoses						
20–30	0.1408	0.1426	0.2909	0.1809	0.4316	0.3235
31–40	0.0742	0.0824	0.4356	0.1982	0.5098	0.2805
41–50	0.0367	0.0401	0.4315	0.2529	0.4682	0.2930
51–55	0.0091	0.0098	0.4235	0.2966	0.4326	0.3064

SOURCE: Author's calculations using Social Security administrative data and a competing-risks estimation model.

NOTE: Probabilities by "either recovery or death" do not necessarily equal the sum of rounded probabilities for the separate causes.
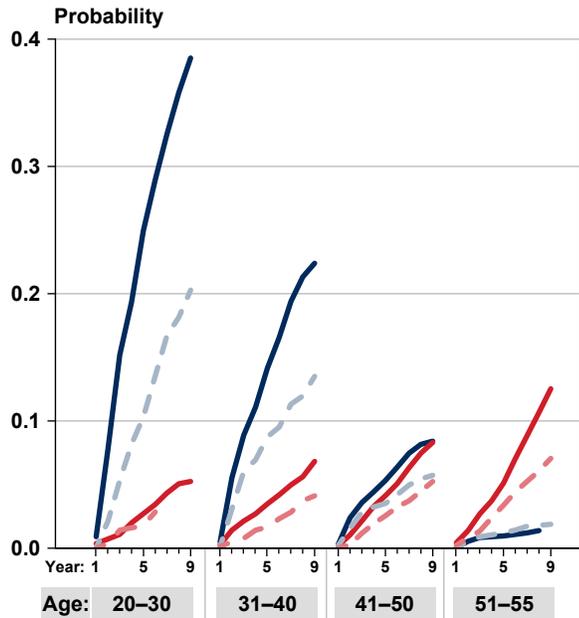
a. Estimates for this age group are drawn from a small sample (86 observations) and should be interpreted with caution.
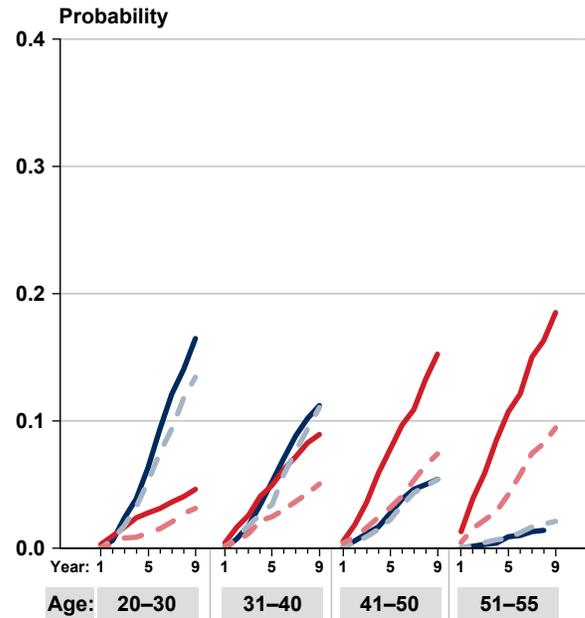
Chart 10.
Cumulative probability of DI program exit because of recovery or death over the first 9 years on the rolls, by selected disability type, sex, and age at entitlement
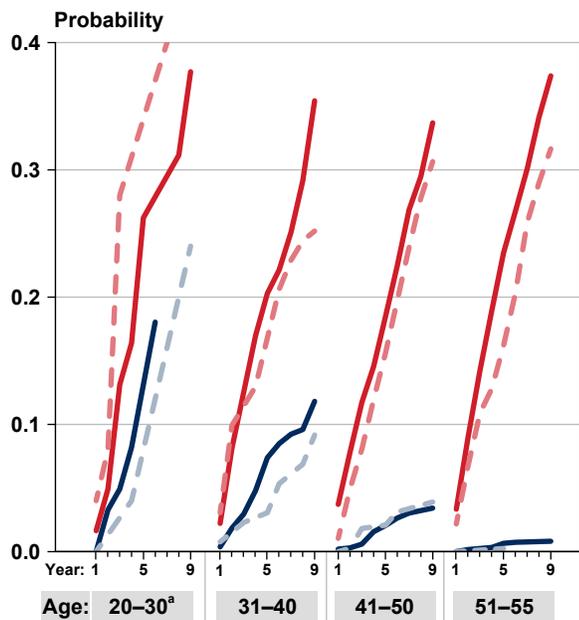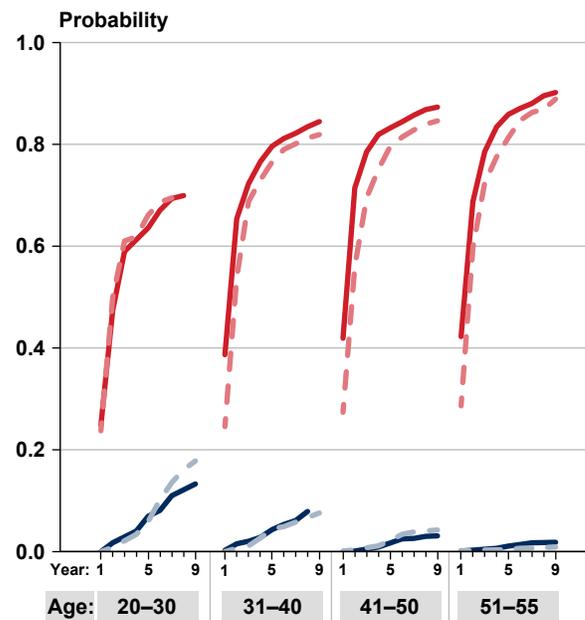
Men:
Death **Recovery**

Women:
Death **Recovery**

Panel A: Musculoskeletal impairments

Probability

Year: 1 5 9 1 5 9 1 5 9 1 5 9
Age: 20–30 31–40 41–50 51–55

Panel B: Mental disorders

Probability

Year: 1 5 9 1 5 9 1 5 9 1 5 9
Age: 20–30 31–40 41–50 51–55

Panel C: Cardiovascular impairments

Probability

Year: 1 5 9 1 5 9 1 5 9 1 5 9
Age: 20–30[a] 31–40 41–50 51–55

Panel D: Neoplasms

Probability

Year: 1 5 9 1 5 9 1 5 9 1 5 9
Age: 20–30 31–40 41–50 51–55

SOURCE: Author's calculations using Social Security administrative data and a competing-risks estimation model.

NOTES: The scale of the y-axis for Panel D (Neoplasms) differs from those of the other panels.

Plots for certain impairment/sex/age-group combinations do not track all 9 years. Missing years indicate absence of sample data.
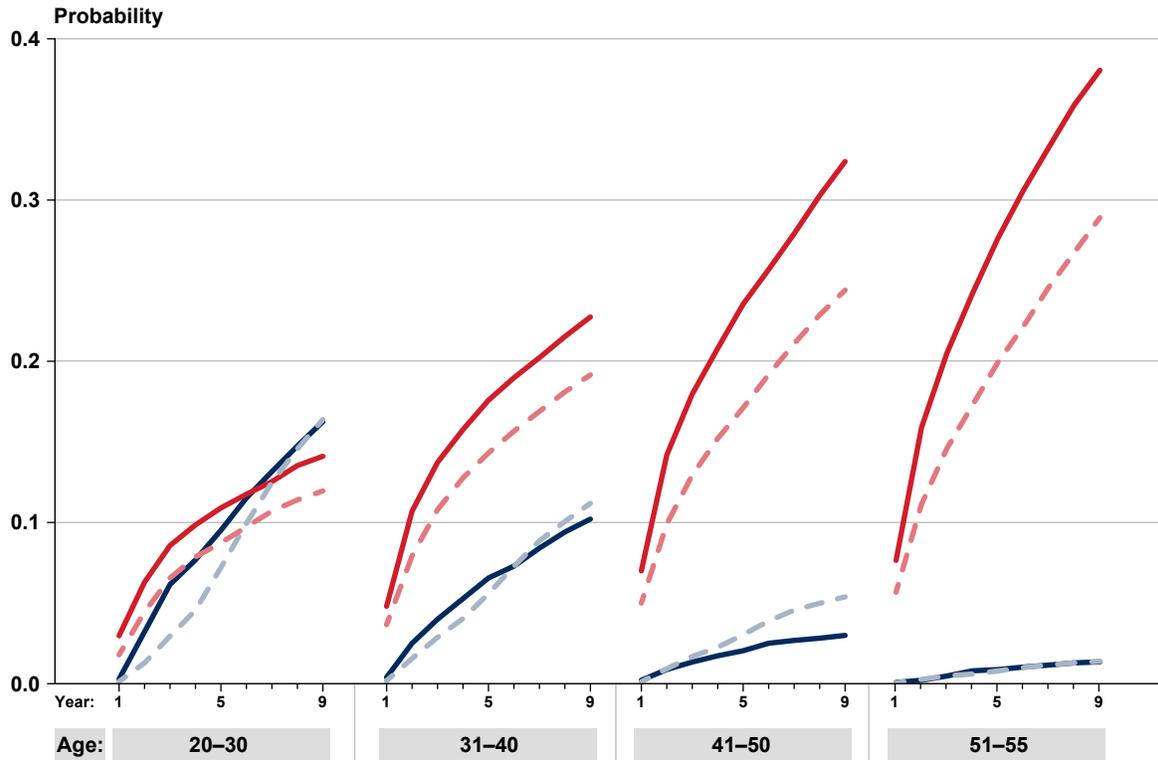
a. Estimates for this age group are drawn from a small sample (86 observations) and should be interpreted with caution.

Chart 11.
**Cumulative probability of DI program exit because of recovery or death over the first 9 years on the rolls:
For all impairments and by selected disability type and age at entitlement, 1980–1989 and 1990–2000**

1980–1989:		1990–2000:	
—— **Death**	—— **Recovery**	- - - **Death**	- - - **Recovery**

Panel A: All impairments

Probability

Year: 1 ... 5 ... 9

Age: 20–30   31–40   41–50   51–55

Continued

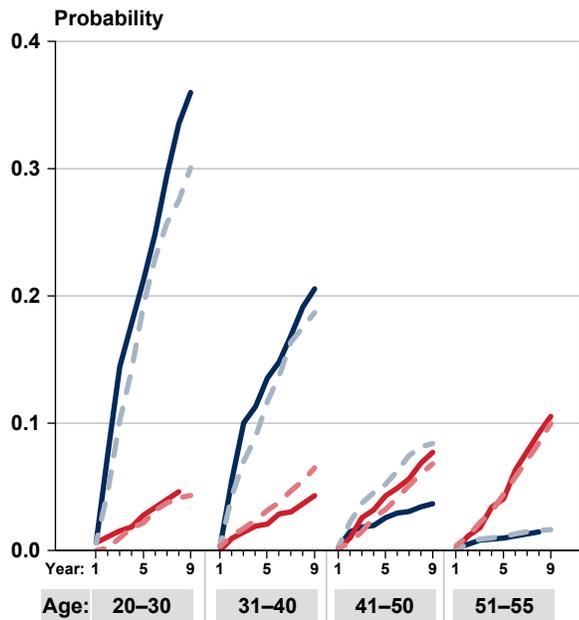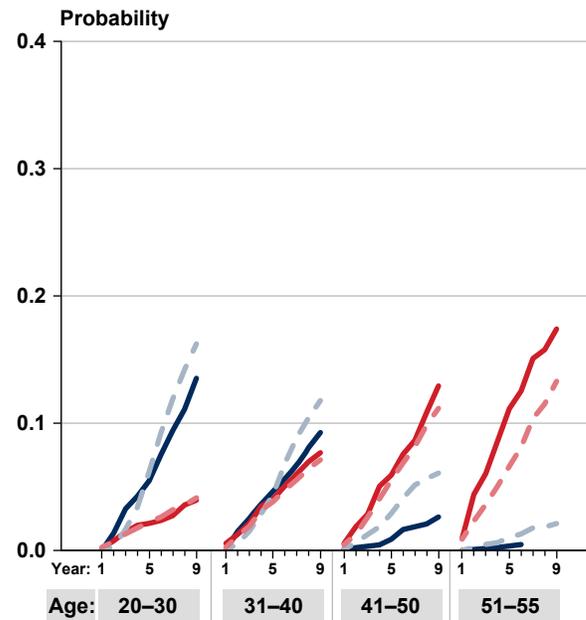**Chart 11.**
Cumulative probability of DI program exit because of recovery or death over the first 9 years on the rolls:
For all impairments and by selected disability type and age at entitlement, 1980–1989 and 1990–2000
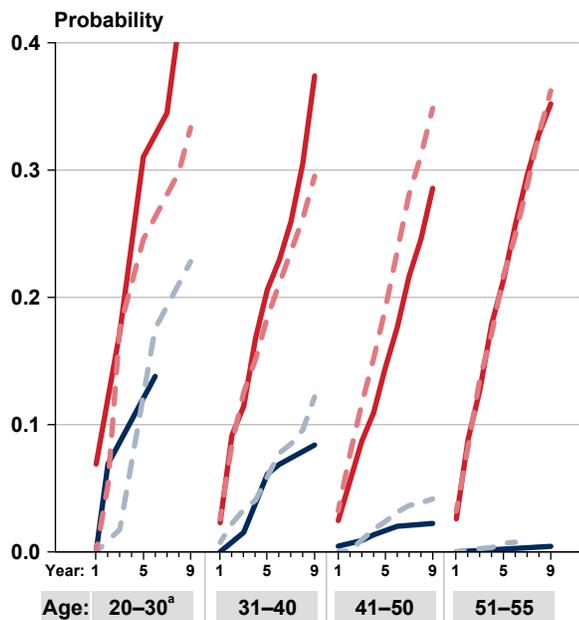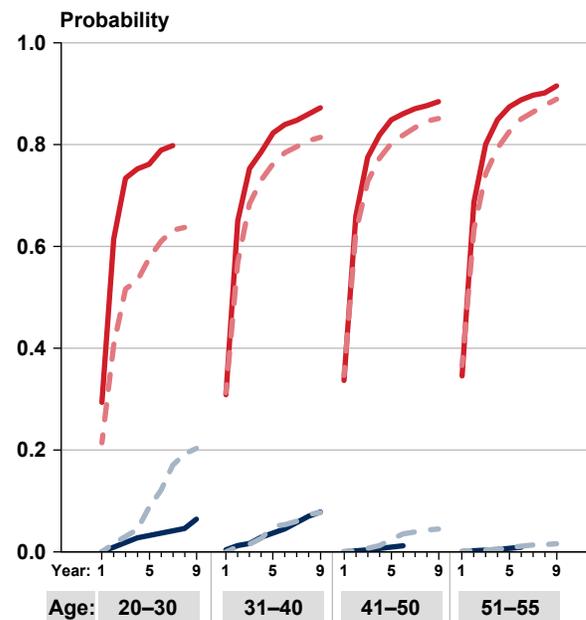*(continued)*

SOURCE: Author's calculations using Social Security administrative data and a competing-risks estimation model.

NOTES: The scale of the y-axis for Panel E (Neoplasms) differs from those of the other panels.

Plots for certain impairment/decade/age-group combinations do not track all 9 years. Missing years indicate absence of sample data.

a. Estimates for this age group are drawn from a small sample (86 observations) and should be interpreted with caution.

Table 6.

Cumulative probability of DI program exit because of recovery or death through the first 9 years on the rolls, by disability type and age at entitlement: 1980–1989 and 1990–2000

Disability type and age	Recovery		Death		Either recovery or death	
	1980–1989	1990–2000	1980–1989	1990–2000	1980–1989	1990–2000
All impairments						
20–30	0.1626	0.1639	0.1411	0.1196	0.3037	0.2835
31–40	0.1021	0.1119	0.2275	0.1915	0.3296	0.3034
41–50	0.0300	0.0539	0.3239	0.2441	0.3539	0.2980
51–55	0.0135	0.0139	0.3805	0.2891	0.3941	0.3030
Musculoskeletal impairments						
20–30	0.3598	0.3006	0.0461	0.0432	0.4060	0.3438
31–40	0.2056	0.1869	0.0430	0.0649	0.2486	0.2518
41–50	0.0367	0.0840	0.0771	0.0681	0.1138	0.1521
51–55	0.0146	0.0164	0.1053	0.0998	0.1199	0.1162
Mental disorders						
20–30	0.1353	0.1623	0.0395	0.0414	0.1748	0.2037
31–40	0.0926	0.1178	0.0768	0.0712	0.1694	0.1889
41–50	0.0263	0.0608	0.1292	0.1117	0.1555	0.1724
51–55	0.0046	0.0211	0.1740	0.1329	0.1787	0.1541
Cardiovascular impairments						
20–30 [a]	0.1379	0.2281	0.4828	0.3333	0.6207	0.5614
31–40	0.0840	0.1218	0.3740	0.2952	0.4580	0.4170
41–50	0.0223	0.0416	0.2857	0.3486	0.3080	0.3902
51–55	0.0043	0.0076	0.3521	0.3623	0.3564	0.3699
Neoplasms						
20–30	0.0642	0.2033	0.7982	0.6374	0.8624	0.8407
31–40	0.0782	0.0769	0.8724	0.8144	0.9506	0.8913
41–50	0.0120	0.0449	0.8845	0.8513	0.8964	0.8962
51–55	0.0092	0.0159	0.9153	0.8893	0.9245	0.9053
Other diagnoses						
20–30	0.1469	0.1388	0.2321	0.2587	0.3789	0.3975
31–40	0.0875	0.0739	0.3518	0.3480	0.4393	0.4218
41–50	0.0235	0.0419	0.3884	0.3464	0.4118	0.3883
51–55	0.0063	0.0103	0.4180	0.3561	0.4242	0.3664

SOURCE: Author's calculations using Social Security administrative data and a competing-risks estimation model.

NOTE: Probabilities by "either recovery or death" do not necessarily equal the sum of rounded probabilities for the separate causes.

a. Estimates for this age group are drawn from a small sample (86 observations) and should be interpreted with caution.

The probabilities of exit because of death tended to be lower in the 1990s than they were in the 1980s across disability types and age groups. Exits because of recovery did not change much in that span except for those aged 41–50 at entitlement (and for those aged 20–30 with neoplasms), for whom the recovery probabilities improved significantly. Among younger DI beneficiaries with neoplasms, the reduction in death rates and the increase in recovery rates from the 1980s to the 1990s are quite plausibly due to improvements in healthcare technology. Such improvements might be responsible for the changes seen in the other impairments as well, but an apparent improvement in health could be due to other factors, such as changing economic conditions or policies, that altered the mix of allowed applicants.

Conclusion

Using merged data from the Social Security Administration's 2008 1 percent CWHS and 831 data files, I have estimated the probabilities of DI program exit because of recovery and death. I used a nonparametric maximum-likelihood estimation procedure on a competing-risks model. Direct estimates calculated by Zayatz (2011) using Master Beneficiary Record data and a different method are, to the extent that they can be compared, similar to mine. I examined exit probabilities by cause, age at entitlement, and sex, as well as for each of five broad disability-type categories: musculoskeletal impairments, cardiovascular impairments, mental disorders, neoplasms, and all other diagnoses.

I find that during the first 9 years in the program, the dominant cause of exit for nearly all disability types is death. An exception to this pattern is seen for beneficiaries with younger entitlement ages and either musculoskeletal impairments or mental disorders, for whom the dominant cause of exit is recovery.

Women exit DI because of death at lower rates than do men at all entitlement-age groups. However, women in younger entitlement-age groups (20–40) have lower recovery rates than their male counterparts. Recovery rates at older ages do not differ much by sex. Those patterns hold for each disability type, with two exceptions: For entitlement ages 20–30, women with cardiovascular impairments exit because of death at higher rates than men do;[9] and the exit rates by cause and age group for men and women with neoplasms are almost identical.

I also find that from the 1980s to the 1990s, for most disability types, probabilities of exit because of death declined while the probabilities of exit because

of recovery did not increase much. The exceptions to the latter pattern are beneficiaries in the 41–50 entitlement-age group (all disability types) and those in the 20–30 entitlement-age group with neoplasms, whose recovery probabilities improved. Part of the change in the exit probabilities by cause from the 1980s to the 1990s is likely due to improvements in healthcare technology.

The findings in this article support the view that demographic shifts involving relatively younger workers, female workers, and aging workers prone to certain type of disabilities underlie some of the observed growth in the number of workers on the DI rolls.

Notes

[1] For details on the CWHS, see Panis and others (2000, Chapter 10).

[2] For more information on competing-risks analysis, see Fine and Gray (1999) and Pintilie (2006). For information on the estimation of various competing-risks statistical models, see Kalbfleisch and Prentice (2002).

[3] More generally, we could use $q_{c,t}^{\alpha}(\tau) = \lambda_c^{\alpha}(\tau)e^{\beta^{\alpha}X_t^{\alpha}}$ where X_t^{α} is a set of variables denoting economic conditions and policy changes at time t for the beneficiary type α, cause of exit c, and year t, and β^{α} is a vector of parameters. The policy variables could be continuous. This is another strength of using a statistical model to estimate exit probabilities.

[4] Zayatz, however, uses weighted averaging of neighboring cells when he encounters a small cell frequency, as mentioned earlier.

[5] I use the public-domain R package *cmprsk* (Gray 2014) to estimate the cumulative incidences. The standard errors for the estimated exit probabilities are omitted. The statistical model can also incorporate other regressors representing economic conditions and policy variables (Kalbfleisch and Prentice 2002). Because input data for such variables were unavailable, this analysis does not use any regressors.

[6] Zayatz reports cause-specific hazard rates by age at entitlement in single years from 16 to 65, by duration in the program from 0 to 9 years, and by sex. To compare his estimates with mine, for each cause of exit, sex, and duration in the program, I average his cause-specific hazard rates for each age at entitlement to the corresponding age group in my analysis, then apply the recursive formula described in the methodology section to compute the cause-specific cumulative incidence functions. For beneficiaries overall,

I apply the same approach, averaging hazard rates for men and women.

[7] However, as noted earlier, this finding is based on observations of a small sample.

[8] Pattison and Waldron estimate that growth in the disability-insured female population (together with other demographic changes) explains 90 percent of the growth in new DI entitlements over the period 1972–2008 and 94 percent of the growth over the subperiod 1990–2008. Lieberman examines the factors contributing to the growth in the percentage of the working-age population receiving DI benefits during 1985–2007 (nearly the same period I examine). He finds that the shifting age distribution of the population explains 28 percent of that growth for men, 15 percent for women, and 21 percent for both sexes together. Changes in the rates of workers who are insured for DI explain 3 percent for men, 18 percent for women, and 12 percent for both sexes together. Changes in the (adjusted) unemployment rate explain 57 percent for men, 45 percent for women, and 50 percent for both sexes together.

[9] This finding is based on observations of a small sample and should be interpreted with caution.

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